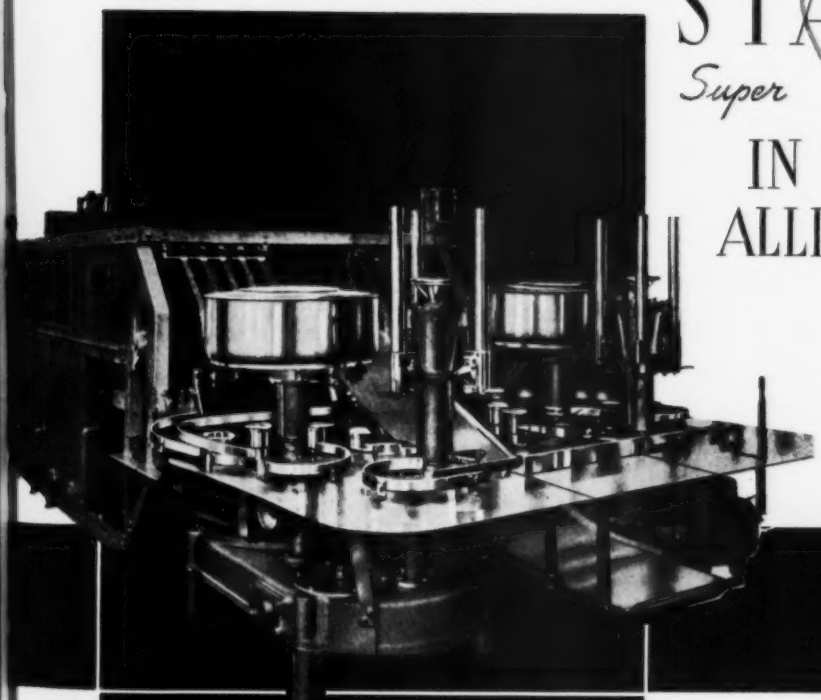
FOOD MANUFACTURE

Incorporating Food Industries Weekly

LEONARD HILL LIMITED, 17, STRATFORD PLACE, LONDON, W.1 MAY 1, 1943

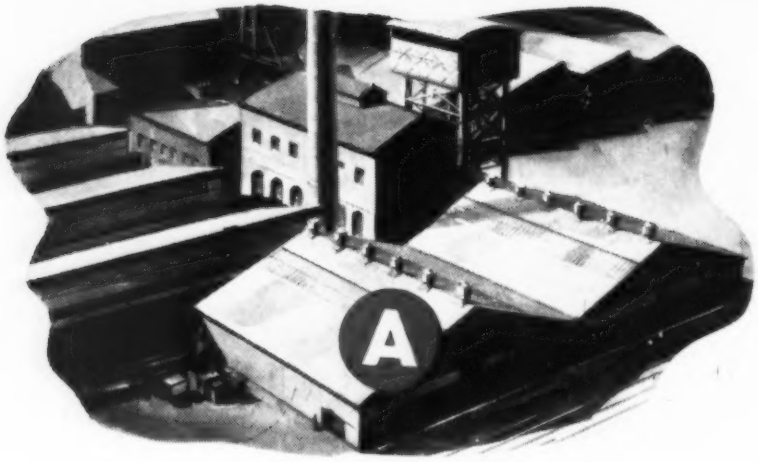
CALIFORNIA STATE LIBRARY

"STAYBRITE" REG. TRADE MARK
Super Stainless Steel
IN THE DAIRY & ALLIED INDUSTRIES



RTH-VICKERS STAINLESS STEELS LTD

Owing to the large demand we are at present greatly restricted as regards the purposes for which this steel can be supplied.



What was the temperature in "A" shop at 3·30 am?

A question for FACTORY MANAGERS, HEATING ENGINEERS, WELFARE OFFICERS, PRODUCTION ENGINEERS ● If you are concerned with FUEL SAVING, Factory Acts Observance or with keeping conditions right for GREATEST OUTPUT, a continuous, unquestionable record of temperature in any room or work-place is often a practical necessity ● Here is an inexpensive, portable instrument just right for the job. Unique design ★ secures great reliability and the instrument needs no attention beyond changing the weekly chart. Price complete £12 . 10 . 0.

SUNVIC CONTROLS LTD., STANHOPE HOUSE, KEAN STREET, LONDON, W.C.2.

SUNVIC

AMBIENT TEMPERATURE RECORDER

★ Write to-day for specification T.R. 10/9.

TAS/SC. 30

FOOD MANUFACTURE

Vol. XVIII, No. 5 May 1, 1943

Contents

	Page
Editorial	139
Rye Flour in National Bread. W. Cunliffe, B.Sc., A.I.C.	143
Preserving Food by Freezing. Book Review	146
Food Packaging—War and Post-War. R. L. Rowney	147
Eels as Food	150
Preservation Freezing of Apricots for Subsequent Processing. M. A. Joslyn	151
Control of Food Patents. S. T. Madeley	155
A Simple Photoelectric Absorptiometer. A. H. Stuart, Ph.D., B.Sc.	157
Sending Food by Rail in Wartime. Graham Saville	159
"Other Fleas . . ." Book Review	161
Society of Dairy Technology	162
Food Research in the U.S.S.R.	162
Ministry of Food: Latest Statutory Rules and Orders	163
News from the Industry	165
Information and Advice	173
Recent Patents, Trade Marks and New Companies	174

Published on the first day of the Month

by

LEONARD HILL LIMITED

17, Stratford Place, London, W.1

Telephone: Mayfair 7383

SUBSCRIPTION

Single Copies	1s.
Annual Subscription	10s.
Abroad	12s. 6d.

The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

Food Tables

IN a note on food tables, Drs. E. M. Widdowson and R. A. McCance discuss their scope and limitations (*Lancet*, February 20, 1943). They say that there are two schools of thought about food tables, one of which tends to regard the figures in them as having the accuracy of atomic weight determinations and the other dismisses them as valueless on the ground that a foodstuff may be so modified by the soil, the season, or its rate of growth that no figure can be a reliable guide to its composition. The authors find that the truth lies somewhere between these points of view and that food tables have a very real value.

Advantage was taken of testing the value of their own food tables (McCance and Widdowson, 1940) for the calculation of the chemical composition of mixed diets in a number of human metabolism experiments. The authors compare the analysed and calculated food intakes of six persons over a period of seven days. The averages are exceedingly close except in the cases of iron and calcium. They ascribe the iron discrepancy to the curried fish, for curry powder is known to have a large and variable amount of iron in it. The calculated calcium intakes are consistently too low, and this is attributed to the fact that, although the subjects drank distilled water, London tap water was used in the preparation of the food and no allowance was made for this.

The paper goes on to discuss the matter of calcium from tap water. It was found that both tap water and salt increased the calcium in cooked vegetables, and, finally, products cooked by the ordinary kitchen methods contained twice as much calcium as they would be reckoned to have according to food tables. They ask the question: "Does this make any significant difference to a person's daily calcium intake?" and point out that the extra quantities are small compared with the 60 mg. or so that people at Cambridge must be getting from their drinking water.

Some interesting suggestions are made regarding the amount of iron contained in foods due to "contamination" from kitchen utensils. Mincers, saucepans, knives all go to increasing the iron intakes in foods, and the authors suggest that kitchen utensils may be an important factor in the prevention of anæmia!

No Ice Cream Research

Several ice cream manufacturers have asked whether it is legal for them to carry out manufacture for experimental purposes with a view to the post-war period. It is only natural that this industry should be looking well ahead. But Article 2 of the Ice Cream (Prohibition of Manufacture and Sales) Order expressly forbids production "except in institutions and households for consumption within such institutions and households". Article 4 of the Order permits the Ministry of Food to issue licences and authorisations for the manufacture of ice cream, but we are informed that the Ministry has no intention of granting such permits whether for experimental or other purposes.

The reason for this firm official attitude appears to be that even the experimental manufacture of ice cream would tend to defeat the purposes for which the industry has been suppressed. One of the main reasons was to release labour, including skilled technical staffs, for work of national importance. Experiments in ice cream manufacture would necessitate the services of these research workers. Moreover, the post-war ice cream will be based on milk and milk products. Experiments would therefore be of little value unless scientists could use these ingredients. The Ministry of Food does not feel justified in licensing the use of milk or milk products for this purpose. The Ministry's duty is to feed the nation *during* the war, not after it.

Tanks for Pilchards

At a meeting of the Cornwall Sea Fisheries Committee at Truro recently, an interesting discussion on summer gluts took place. There was considerable loss of fish because of difficulty of disposal. Every season there was a glut, and something should be done to make use of the fish. It was stated that the chief method of disposal was to put the fish into tanks, which was better than throwing good food into the sea. The chairman, Mr. Trengenza, considered that unless the Ministry of Food financed a scheme for dealing with the position it would be a failure, and a member said that as there were plenty of vats available the Ministry should be asked to do so. It was decided to make representations to the Ministry on the lines of the discussion. Apparently the Cornish fisherman is in a quandary. If he dumps his fish on the quay he would be summoned by the harbour authorities, and if he throws it back into the sea he is liable to be prosecuted by the Ministry of Food.

Salted pilchards are not particularly attractive food to the Englishman, but might prove useful in an emergency. It has been suggested that, at the end of the war, the Italians will eagerly snap up all we can send them. It will be instructive to know the results of the Cornwall Sea Fisheries Committee's suggestion.

Pasteurisation of Milk

The discussions on pasteurisation seem unaccountably to make "angry passions rise", and the less informed on the subject some of the protagonists are the angrier they get.

During question time in the House of Commons recently some exchanges were made that threw a somewhat lurid light on this. Here are some of the questions: Mr. Stokes: "Is it not a fact that in an experiment at Newcastle not many years ago rats were fed on pasteurised milk and died of it?" Viscountess Astor: "But children are not rats."

Mr. Purbrick stressed the "fact" that pasteurisation does nothing towards destroying those bacteria which gain access to milk after being pasteurised, to which the Minister of Health replied that he (Mr. Purbrick) had overlooked the fact that when lactic bacilli have so soured milk that it is unfit for human consumption the growth of other organisms may be inhibited by the acid produced. Apparently to show that pasteurisation wasn't really a serious subject, Commander Locker-Lampson interpolated: "If pasteurised milk is so bad for people, will the right hon. gentleman feed Hitler on it?"

The discussion was closed by the remark by Dr. Thomas that he (the Minister) was getting somewhat muddled, and he asked whether "he ought not to seek guidance from the House instead of from the employees and lackeys of the big milk producers, the bacteriologists?"

With the reply from the Minister that he disagreed with every single sentence of the hon. gentleman's question, this "scientific" discussion ended for the moment.

Food A-Plenty for Scotland

Scientific experiments now being made in a Scots loch and in the steam sterilisation of soil may result in a "miraculous era" of fish and food plenty for Scotland, it was disclosed by Mr. Tom Johnston, Secretary for Scotland, when he addressed the annual meeting of the National Farmers' Union in Edinburgh recently. "Within ten miles of where we now meet there is a firm of market gardeners who have steam-heated and sterilised their soil," he said, "and last year, I am informed, they took six full crops from it and, in some commodities, eight crops. In point of time that firm can now beat all the Continental growers in the early markets."

The firm of market gardeners mentioned by Mr. Johnston state that they had been experimenting for some time with intensive cultivation by heating the ground. "It is quite true that last year we took from six to eight crops of vegetables from the same soil. We have 10,000 sheets of glass in frames covering two acres and eight acres of ground which we sterilise by hot water or steam.

In January we cut lettuces planted last August, and are now cutting lettuces planted this year. We grow carrots, turnips, cauliflowers, cucumbers, celery, melons, and radishes by this method. We can, in fact, grow vegetables at any time of the year, and two or three crops simultaneously."

Mr. Johnston also told of a small, quiet loch in the West of Scotland where scientists are working on the theory that sea fish can be multiplied by treating the sea plant food they eat. The experiment, largely inspired by Sir John Graham Kerr, M.P., the marine biologist, is being carried out by a large chemical corporation. "By adding certain fertilisers in the form of nitrogen and phosphates last year," said Mr. Johnston, "they multiplied the weight of the flounders by ten. This year, I believe, they are testing their theories on haddocks' eggs. Sir John Graham Kerr tells me there is also opening up of a considerable oyster industry on the west coast."

Another "age of plenty" experiment mentioned by the Secretary of State is being carried out by the Department of Agriculture in deer forests and large sheep farms which were going derelict when taken over in 1940. "From five of these alone last year we raised 165,000 lbs of mutton, 54,000 lbs. of beef, and 72,000 lbs. of wool."

Canned Meat

American meat canners have their eye on the post-war market in this country. A powerful trade organisation in the United States is making enquiries in British trade circles to ascertain what is likely to be the post-war demand for American canned meats now marketed here under the Lease-Lend agreement.

Distributors, both wholesale and retail, are of opinion that post-war prospects for American canned meats are distinctly favourable. People buy them not merely because they contain almost 100 per cent. meat, compared with about 30 per cent. in the products British canners are allowed to pack, but also because the American products are agreeable to the palate.

The two main United States products are corned beef and canned pork, neither of which is produced in this country. Nevertheless, all imported canned meat must, under normal trading conditions, compete with British products.

Before the war most of the corned beef consumed in this country came from South America. The proportion from the United States has increased during the war, and distributors believe that after the war the States will have a much larger hold on the market than they had in 1939. The American canned pork products are new to this country; the public definitely like them; and distributors are satisfied that the popularity of canned pork will continue after hostilities have ceased.

The position is that American canned meats will retain, and possibly increase, their hold on the British market. On the other hand, the products that British canners are now permitted to pack will mostly disappear and will be replaced by products of higher food value. The new British products, however, will have to begin all over again the task of winning popularity in the home market.

Vitamins for Animals

Accounts of work with vitamins occupy a considerable portion of the latest Annual Report of the Wisconsin Agricultural Experiment Station. S. Black and C. A. Elvehjem have found evidence that white rats build up their own supplies of certain B complex vitamins, apparently through bacterial action. Following as it does the revelation that cattle synthetise B vitamins and that both rats and chicks are able to form nicotinic acid, this finding serves to emphasise the suggestion that synthesis of vitamins is probably very important in the nutrition of animals. Whether man is able to build part of his vitamin supply is not yet known.

In the curing of vitamin A deficiency in some animal experiments, tocopherol (vitamin E) should be fed along with carotene in certain conditions, in order to obtain maximum effect. This does not necessarily mean that extra vitamin E has to be fed along with carotene in rations containing natural grains or oil, for such feeds contain vitamin E or other compounds having similar properties. It is only when highly purified synthetic rations are used that tocopherol is needed to prevent carotene from being oxidised. Hydroquinone and related anti-oxidants apparently protect carotene during storage, but not after they are fed. This may be because they are more readily soluble in water than in fat, hence in the digestive system they may be washed out. Tocopherol is fat-soluble.

The discussion about "vitamin F" (linoleic acid) in the *Manufacturing Chemist* a few years ago is recalled by findings about acrodynia, a severe dermatitis of white rats. This is brought about by a fourfold dietary deficiency. F. Quackenbush, F. Kummerow, D. Anthony and H. Steenbock have demonstrated that the needed factors are linoleic acid, an important constituent of many fats; pyridoxine, the pure form of vitamin B_6; pantothenic acid, another B complex vitamin; and, to a minor extent, another substance which is probably the "accessory factor" of vitamin B_6 previously reported from the Wisconsin Station.

When rats were kept on a synthetic acrodynia-producing ration, the addition of linoleic acid alone cured the disease symptoms, but failed to start the animals growing again. On the other hand, pyridoxine and pantothenic acid together made growth possible, but failed to cure the

marked dermatitis. All three—linoleic acid, pyridoxine and pantothenic acid—remedied the entire difficulty except for a persistent scaliness of the animals' tails. This can be cured by the fourth, or "accessory", factor.

This new evidence of the dietary need for linoleic acid supports a good deal of information which, in spite of its lack of precision, suggested that linoleic acid is almost specific as a preventive and curative agent in some skin conditions.

Work at the Wisconsin Station with vegetable oils indicated that in general their ability to cure acrodynia was in proportion to their content of linoleic acid, but there were some exceptions. Cod liver oil and shark liver oil tended to aggravate rather than cure acrodynia.

Effect of Salt on Ascorbic Acid

Elaborating on an idea suggested earlier by Kellie and Zilva, Hoygaard and Rasmussen of the University of Oslo, pointed out that if it is true that sodium chloride has an inhibiting effect on the oxidation of ascorbic acid it may be of considerable importance. Hoygaard and Rasmussen cooked potatoes, cabbage and ox liver in glass-distilled water with and without the addition of sodium chloride, at a concentration of 1 per cent. The potatoes were cooked for 45 minutes, the cabbage and ox liver 20 minutes. The foodstuffs were added to the water after boiling had started. The following results were obtained:

	Cooked in Distilled Water.			Cooked in Distilled Water with 1% Sodium Chloride.		
	% in Substance.	% in Water.	Total.	% in Substance.	% in Water.	Total.
Peeled potatoes ..	93	13·5	106·5	107	17	124
Cabbage	54	20·5	74·5	32·5	56	88·5
Ox liver	46	44	90	38	52	90

The figures show a saving of from 16 to 19 per cent. more ascorbic acid when the vegetables were cooked in salted water than when they were cooked in unsalted water. With reference to the high ascorbic acid content in the potatoes cooked with salt, Hoygaard and Rasmussen attribute this to the difficulty of extracting the vitamin from the raw vegetables and measuring it before some of the acid is destroyed.

Arsenic in Sausages

A disquieting case of food poisoning by arsenic was the subject of an inquiry at Fife on April 6. Two people died and 115 others became ill after eating sausages made by a butcher in St. Andrews. On analysis the sausages were found to contain 1·42 per cent. arsenic in the form of arsenious oxide. This means that about 5 ozs. of the arsenic compound would have been introduced in a batch of 35 to 40 lbs. of sausage meat, an amount, the County Analyst is reported to have stated, "too much to have found its way accidentally to the batch".

Sheriff More said it was very clear that there must have been arsenic in the butcher's shop, and that somehow or other it was introduced into the sausages in the process of their manufacture, but there was no evidence as to how it came to be in the shop at all. The result was very unsatisfactory from the public point of view. Two valuable lives had been lost, and it appeared that a great many other people in St. Andrews were affected from the same source.

Presumably the matter will not be allowed to rest there. The large amount of arsenic involved should facilitate investigations. A very large handful of white powder was introduced into a relatively small batch of meat. The distribution was evidently uneven, otherwise the death-roll might have been very large. Apparently the other added ingredients are not implicated because other batches would also have contained arsenic. This mystery should be solved.

Cocktails and Raisin Wine

There have been certain manufacturers who, appreciating the almost universal desire for a little drop of something with a "kick", have had recourse to such names as cocktails and wine. A "non-alcoholic" cocktail recently offered to the public consisted of 99·4 per cent. water, the other 0·6 per cent. being made up of colouring matter, a flavouring essence, saccharin and tincture of capsicum—the latter presumably supplying the kick. To heighten the illusion, the label showed the design of many attractive fruits.

In one of Thackeray's novels he uses the word cocktail to denote "a person passing for a gentleman, but underbred". According to this definition the non-alcoholic cocktail was well-named, for the pedigree one consists of "a beverage of spirit, iced and flavoured with bitters", although there are other members of the aristocratic family such as oyster and clam cocktails—"preparations of oysters or clams in ketchup and lemon juice, seasoned with tobasco sauce and served in a glass".

The Bench found the non-alcoholic cocktail definitely underbred, and imposed a fine of £75, with £18 18s. costs.

Another misnamed drink was "Rich Raisin Wine —non-alcoholic", complete with picture of grapes on the bottle. This turned out to be a solution of sugar and phosphoric acid with a little colouring and flavouring. On behalf of the defendants it was said that they had altered the description on the label to "Raisin flavour Wine", but the "flavour" was in very small print, and the picture of grapes still hit the eye. A naïve statement on behalf of the defence was that "raisins were very difficult to get, and that was the reason why their juice was not used, though there was a raisin flavouring!" The Bench imposed a fine of £15, with £10 10s. costs.

Rye Flour in National Bread

W. CUNLIFFE, B.Sc., A.I.C.

RYE FLOUR contains a high proportion of soluble proteins and little or no gluten, thus yielding when baked by itself, or in fair proportion with wheat flour, small-volumed loaves with poor oven-spring, according to Ford,[1] Banfield[2] and Bennion.[3] Citing other authors, Bailey[4] states that over 4 per cent. of rye reduces the strength of wheat flour, as shown by the impaired loaf volume and texture, while Bennion[5] mentions the use of up to 3 lbs. of rye per sack with a strong wheat flour, but observes that with softer flours rye makes the dough runny and the bread flat in appearance, because of its active enzyme properties. All the aforementioned authors found a reduction in colour score of the finished loaf as a result of the addition of rye to wheat.

Two interesting notes on the addition of rye to wheatmeal flour as distinct from white flour have been published recently by A. R. Daniel[6] and "Astolat",[7] which describe the quicker ripening and reduced oven-spring of rye-wheatmeal doughs, and note is made of the increased bloom, pleasing flavour and good keeping qualities of the finished loaf.

A. Schulerud,[8] C. W. Brabender, G. Mueller and A. Koster[9] state that the most important factor in rye flour is the starch, which pastes more readily than does wheat starch. H. Scholz,[10] however, considers that the influence of rye albumin on the baking quality of rye flour has been underrated.

Ford has reported that the percentage of sucrose and reducing sugars are two or three times greater in rye than in wheat, but that the maltose value is the same order as for wheat flour—*i.e.*, 1·5 to 3 per cent. Detailed figures for the approximate analysis of rye flour are given in *Modern Cereal Chemistry*, 2nd edition, Kent Jones.[11]

As, apart from the aforementioned notes by A. R. Daniel and "Astolat", there are few published data on the effects of the addition of rye flour to wheatmeal flour, it was considered opportune to study the physical characteristics and gassing powers of wheatmeal doughs containing rye flour. Accordingly, experiments were carried out on wheatmeal doughs containing 25 per cent. rye flour, fermented under varying conditions of time and temperature, the results of which are set out below.

The selection of the particular percentage of rye flour added to the wheatmeal in these experiments was governed by the idea of emphasising alterations in the characteristics of the resulting doughs.

The Rye Flour

The rye flour purchased for the experiment and sold as No. 1 grade 60 per cent. extraction was not unlike national wheatmeal in appearance but had more of a grey shade. Its effect on the farinogram of a control wheatmeal flour when added at the rate of 25 per cent. is indicated in Figs. 1 and 2. The development time is reduced, water absorption increased by ½ per cent., the dough stability is reduced, as also is the elasticity and extensibility, and the dough weakened slightly, due to the rapid water-absorbing properties of the rye starch present and the reduced gluten content of the mixture. The initial drop in consistency after two minutes' mixing, due to the preferential absorption by the rye flour, should be noted.

The approximate chemical composition of the rye flour was:

	Per cent.
Moisture	14·55
Fat	0·92
Protein (×5·7)	6·21
Ash	0·70
Carbohydrates	77·14
Fibre	0·48

Maltose value = 3·1 (compare control flour, maltose value = 1·7).

Baking Tests

All the loaves described below were hand-made, divided and moulded, fermented and proved in a constant temperature cupboard at 82° F. and baked in a thermostatic oven at 475° F. For each test dough, a total of 56 ozs. of flour was used; the water absorption was maintained throughout at 32 ozs.—that is, 16 gall. per sack—and the salt kept constant at 1 oz., equivalent to 5 lbs. per sack. Observations were made on the influence of bulk fermentation time and temperature on the finished loaf.

The control loaves, designated by the letter C, were all made from 85 per cent. wheatmeal flour; those designated by the letter M contain a mixture of 25 per cent. rye flour and 75 per cent. wheatmeal flour of 85 per cent. extraction.

For the gassing power test, 100-gram pieces of the dough were scaled and placed in air-tight cylinders im-

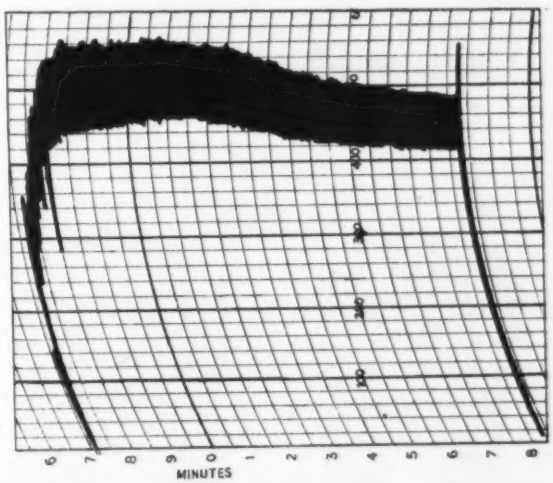


Fig. 1.—100 per cent. Wheatmeal. Water Absorption 62·5 per cent.

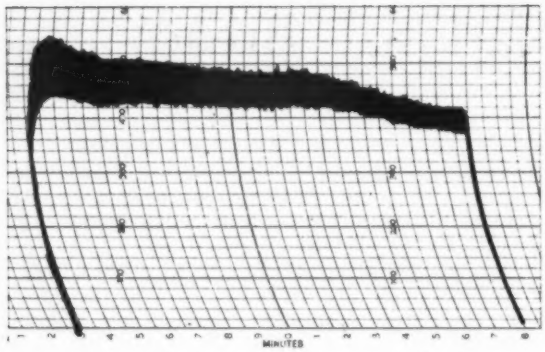


Fig. 2.—25 parts Rye Flour. 75 parts Wheatmeal. Water Absorption 63 per cent.

mersed in a thermostatically controlled water bath at 82° F. ± 0·1° F. and connected to a Cambridge Pressure Recorder, as described by Seville.[12] In this case, however, a two-pen instrument was used, enabling simultaneous readings of the control doughs and rye mixture doughs to be made.

Test A. Cool 4-Hour Dough at 77° F.

Twenty-five per cent. rye flour addition reduced loaf volume slightly and gave a closer and heavier crumb. A surprisingly good result was obtained, oven-spring and recovery at proof was well maintained, flavour was characteristic and pleasing. A moister loaf which kept well was produced, and bloom was increased. See Figs. 3 and 4.

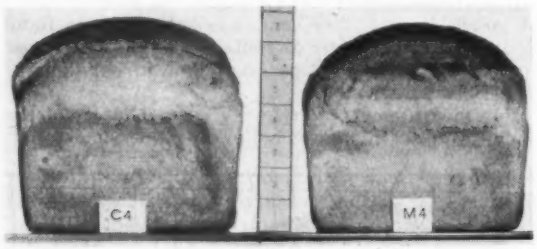


Fig. 3.

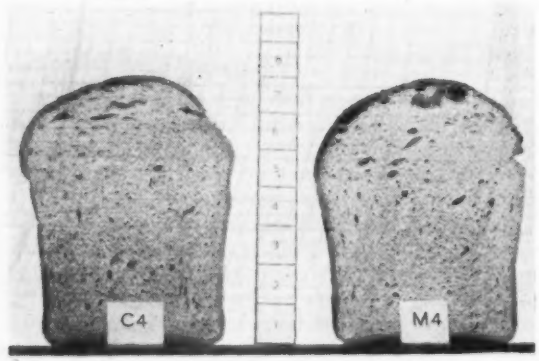


Fig. 4.

Test B. Cool 2-Hour Dough at 76° F.

The same remarks apply as in Test A. Again loaf volume and oven-spring were surprisingly good, and were little inferior to the control.

In both Test A and Test B the main difference between the rye-mixture loaves and the control loaves was (1) a decided loss in the spring of the crumb of the former, which had a dead and cloggy feel, and (2) an increased bloom on the crust of the 25 per cent. rye loaves. See Fig. 5.

It should be noted here that while the above doughs were cool and hand-made, divided and moulded, in practice, where heavy plant has a tendency to fell the doughs, especially with weaker types of flours, the rye flour mixture may not compare so favourably with the control. To test the effect of the 25 per cent. rye addition on fermentation tolerance, warmer doughs, 3° F. to 4° F. higher than would normally be used in the test doughs, were made.

Test C. Warm 4½-Hour Dough at 80° F.

A 4½-hour dough at 80° F. was chosen as constituting a stiff test for wheatmeal alone under the conditions of the experiment. Any further reduction in flour quality should be easily apparent.

Loaves C3½ and M3½ were scaled at 3½ hours and loaves C4½ and M4½ at 4½ hours. The photographs show that the 25 per cent. rye mixture could be scaled with advantage at 3½ hours. Extending the fermentation to 4½ hours, although increasing loaf volume, produced too open a textured loaf, weak under the top crust and a definite loss in flavour resulted. On moulding at 4½ hours the skin of the dough broke very readily and produced a loaf with a rough blistered crust. The texture would be improved by shorter proof, but flavour would still be lost. On the other hand, 3½ hours' bulk fermentation was too short for the control wheatmeal even after 55 minutes' proof as against 50 minutes' proof for all the other loaves. Loaf volume was poor and texture close. Taking the 4½-hour wheatmeal loaf as the standard, the 4½-hour rye mixture loaf was decidedly inferior in all respects, loaf volume only being maintained at the expense of flavour, crumb spring and keeping qualities. The 3½-hour rye mixture loaf had a satisfactory flavour, but was inferior to the 4½-hour control wheatmeal loaf in volume and spring of crumb. Again the 25 per cent. rye mixture gave more bloom and a shade darker crumb (see Fig. 6).

Test D. Warm 2-Hour Dough at 80° F. 40 Minutes' Proof

The 25 per cent. rye loaf M2A (Fig. 7) was equal in volume and oven-spring to a control loaf made from wheatmeal alone. In all other respects it was inferior. Cutting down the dough time to 1½ hours produced a loaf, M1½, which, although lacking in volume, had a satisfactory flavour, crumb, spring and keeping qualities, and proved to be the best loaf of the rye mixture series.

In all the tests described above, the addition of 25 per cent. rye flour to wheatmeal flour produced very sticky doughs. Provided cool doughs were used, stability was good, but with warmer temperatures the doughs ran soft towards the end of the fermentation. As may be expected from the high maltose content of the rye flour, gassing power was increased (Fig. 8).

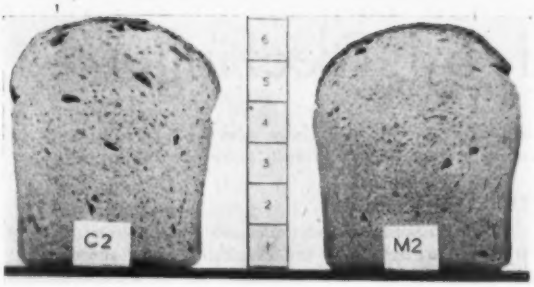


Fig. 5.

Summary

The addition of 25 per cent. rye flour to wheatmeal flour results in sticky doughs with reduced tolerance and increased gassing power. Loaf volume is reduced with more bloom and a closer textured and darker coloured crumb.

The reduced tolerance is due to :

(*a*) A reduction in gluten quantity. The gluten washed from the 25 per cent. rye dough after 4 hours was 20·3 per cent. as against 25·12 per cent. for the wheatmeal dough.

(*b*) The softening effect of the rye proteins.

The comparatively good-volumed loaf produced by the 25 per cent. rye mixture, even on extended fermentation, would appear to confirm the observation of H. Scholz that the rye albumins have some influence on the baking quality of rye, probably due to their coagulation in the oven. The addition of a higher extraction rye flour containing more bran and soluble proteins would have a greater influence on loaf volume. Owing to the closer texture produced and high-water absorption of the rye starch, longer baking is required with the rye mixture.

Although when using cool hand-made and hand-scaled doughs good loaves can be obtained with the addition of No. 1 grade 60 per cent. extraction rye flour to national wheatmeal, the inclusion of 25 per cent. rye flour in wheatmeal doughs is likely to cause trouble in machine bakeries and raise severe dusting problems. A short and fast dough is required under such conditions.

The addition of 5 per cent. rye flour provided the extraction is not too long should cause little or no trouble.

In conclusion, the author wishes to thank Mr. J. M. Nicol of the British Research Association for his assistance with the photographs and the directors of the Standardised Food Products Co., Ltd., for permission to publish.

(*Continued on page 160*)

Fig. 6.

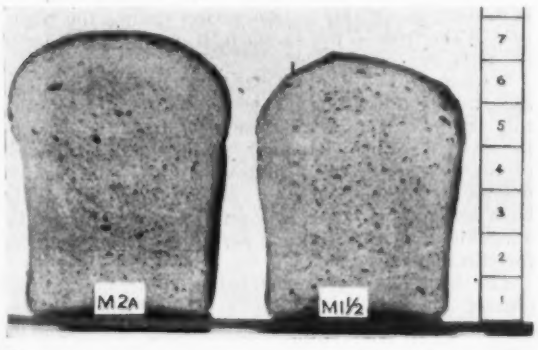


Fig. 7.

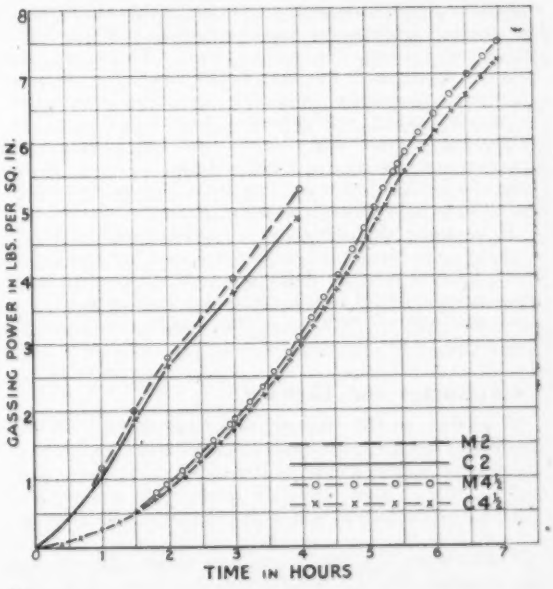


Fig. 8.

Preserving Food by Freezing

THE future should be the culinary golden age for the housewife. In the winter her larder shelves will be loaded with tins of dehydrated, revitaminised vegetables and fruits, harvests of half-forgotten springs and summers.

In the summer her refrigerator will deliver fish stricken cold at the moment of death—quick frozen. Neat packages will contain chops and steaks, strawberries, and every conceivable delicacy, indistinguishable (or would they be distinguishable?) from what used euphemistically to be termed " fresh ". Nor will canned foods be absent—for every sort of processed food will be represented.

It is with a new book* on the subject of the freezing of food that these notes are concerned. As with dehydration, the cooling of food for the purpose of its preservation was carried out by ancient races such as the Egyptians, Greeks, Romans and East Indians, but it was as late as 1875 that Dr. Carl Linde introduced the ammonia compression machine and brought to an end what the authors call " the dark age of refrigeration ".

It is interesting to note that quick freezing of food products has been known for about one hundred years. In the course of 30 pages the different quick-freezing systems are clearly indicated and the expositions well illustrated, as are all the other parts of the book. A very useful table is appended which comprises a partial list of quick-freezing patents.

Frozen Food Locker Plants

Frozen food locker plants are an increasing feature of American refrigeration, and it is natural that the authors devote considerable space to them. Their functions differ in type from plants designed primarily for renting lockers and supplying meat cutting, packaging and sharp freezing services. There are also plants whose chief business is the operation of a refrigerated warehouse, creamery, or some other enterprise employing refrigeration, but which rent refrigerated lockers and supply food preparation and freezing services as a sideline. Again there are plants which combine locker rental with a retail establishment such as a grocery or meat market.

It is stated that although a million farmers (in the U.S.A.) now rent refrigerated lockers they only partially fill their needs. Some practical suggestions as to the construction of freezing cabinets and farm freezers may well interest farmers in this country.

Cold Storage and Thawing

A section on the changes occurring during the preparation, freezing, cold storage and thawing of foods gives a very good *précis* of the subject, but here, as in other parts of their book, the authors do not overload the text with matter which may be found in more appropriate places. For those who wish to follow special subjects there is available a generous bibliography.

Fruit Preservation

Although some of the fruits which are given a lot of attention are exotic to the English reader, some of the common ones grown in this country are included.

The descriptions of the preparation of fruits for freezing and the manufacture of fruit juices give a good idea of current methods.

The authors assert that the greatest triumph of modern refrigeration is the freezing preservation of vegetables, although not all vegetables can be so preserved. In general vegetables which are commonly cooked before being eaten can be satisfactorily preserved by freezing and storing. On the other hand, those which are eaten without cooking do not yield desirable products. " Scientists have not yet learnt how to freeze vegetable tissues and still retain their crisp texture; until the chemical, physical and physiological effects of freezing are better understood, satisfactory procedures for accomplishing this are not likely to be found."

In the preparation of vegetables for freezing the importance of blanching has been established. Kohman in 1928 called attention to the necessity for the inactivation of enzymes by blanching and simultaneously Joslyn and Cruess (1929) came to the same conclusion. It is a matter for surprise that in the early days of vegetable dehydration the necessity for blanching was not realised.

Further chapters cover the freezing of meat, fish and poultry, eggs and milk, as well as their storage, marketing and transportation.

Nutritive Values

Freezing appears to have little or no effect on the proteins, in the case of crabs and milk, the two examples quoted. Oxidised fats do not possess the nutritive value of sweet fats, but the development of rancidity in fatty meats may be inhibited by low storage temperatures, and (the authors state) it is evident that under proper storage conditions changes in fats are of no significance from a nutritive standpoint.

Even at cold storage temperatures there is a gradual hydrolysis of the sucrose of fruits to dextrose and lævulose. Since this action occurs during the digestion of the fruit in the stomach, it makes the sugar of the fruit more digestible.

With regard to minerals, the conclusion is come to that, taking everything into consideration, it is probable that the loss of minerals through " drip " is offset by the lesser loss during cooking. Recent data on the loss of vitamins are given in the text, and these are supplemented by the bibliography. In the final parts of the book the authors stress very strongly the necessity for adequate quality control and sketch out recent methods for effecting this.

The book is a very well-balanced account of the present state of knowledge regarding the different aspects of the freezing preservation of all classes of foods.

T. C.-W.

* *The Freezing Preservation of Foods.* By Donald K. Tressler, Ph.D., and Clifford F. Evers, B.S. Pp. xvi+789. 1943. New York. $8.

Food Packaging—War and Post-War

R. L. ROWNEY

AT a time when there is so much discussion as to how food packaging will develop in the post-war years of economic resuscitation it is instructive to consider the effect which war traditionally has upon the secular trend of the industry. Nothing under the sun is new. Dehydration is reckoned something of a novelty, but prunes have been a common item of diet in many countries for the past two thousand years or more, and prunes are dehydrated plums. Biltong has sustained the African for countless ages past, and biltong is dehydrated meat. Raisins are dehydrated muscatels, and their history is as long as that of wine.

What changes is the process. The principle has always been there. Napoleon is generally reckoned to be the father of food packing. He offered a few thousand francs for an idea which would conserve his army's food in a durable package. He gave his prize to the wrong man, to a Parisian who introduced the idea of glass packing.

The system was admirable. Food was introduced into glass containers and the containers introduced into boiling water and sealed at steam heat. The trouble was, when roads were bad and vehicle springs unresponsive, that the bottles tended to break.

The prize should really have gone to an Englishman, who had the wit to use iron cans and the foresight to lay on a surface of tin so that the food did not become contaminated by rust. So food packaging in the sense in which we now understand it started in a war. Its development, too, has been marked by gradual phases of progress in times of peace and the sudden jumps which research has displayed under the iron necessity of war.

Return to What?

There would seem, therefore, to be something amiss with the argument to which the majority of observers now incline, that after the war there will be a lively and prompt return to pre-war packaging conditions and ideas. In one sense, of course, it is true that there will be this simple reaction.

Food packaging to-day is spartan because packaging, as much as shipbuilding or aeroplane manufacture, is fighting a war. It is obvious that the rebound from wartime drabness and utilitarianism will be a return to luxury designs and colouring, and it may be that this phase will be marked by quite unnecessary, if natural, extravagances. This is indeed the safest of all bets, and not merely because the "revolt against the war" will be a natural thing, but also because there will be an economic necessity considerably higher in the scale than the old commercial necessity to sustain goodwill. There will be a need to discover how far old markets can be regained in competition, and how far new markets can be won.

The Price Factor

In another respect also it is possible to reinforce the arguments of the high-colour-and-intricate-design school of thought. A package varies in its elaborateness largely according to the price of what it contains. A perfume bottle of the better sort would more than equal in terms of money the cost of its contents if it held cornflour instead of Coty.

The trend of prices generally has great relevance to post-war conditions, because it will be a surprising thing if there is not allowed to prices some freedom for reacting to the basic economic stimuli which will be tending powerfully to lever up the general price level. It may well be that the price of foodstuffs after the war will show a greater proportional increase than those of most other commodities, because the price of foodstuffs now is so largely controlled by direct and indirect subsidies which can hardly endure as a running charge against the Exchequer when the compulsion of war is past.

Even during the war period there has been a sensible increase. According to the Ministry of Labour's index of retail food prices the level has increased from 100 when war broke out to 119. It must be considered, too, that some food prices have been so powerfully controlled that they have scarcely moved at all. And we shall see the extent to which they will strain at the leash when the time for modifying control arrives.

In such circumstances it is obvious that, unless the prices of packaging materials are elevated similarly, there will be, if the ratio between the cost of the packaging and the cost of the contents is maintained, a higher expenditure on packaging than in pre-war times. Such a trend would give wide scope to the inventiveness of the designers of packages.

Lessons to Remember

But on the wider interpretation it is quite wrong to talk about food packaging in the post-war period as though it were going to be merely packaging that had thrown off, like the snake its skin, the incubus of war. As in Napoleon's day, and as in 1914-18, so in this war packaging has learned invaluable lessons in manufacturing technique which it will not lose, but which will serve as a springboard for future developments. The level of operating efficiency in canning and bottling plants has undoubtedly increased to an extent not generally realised, and, of even greater importance, research has discovered new material apt for packaging, and new uses for old materials. It is in this sense that post-war times may be expected to witness, not the obliteration of war experience but its full utilisation, and it is in this sense that the return-to-normal school is out in its guess.

Plastics Ascendant?

It seems a long time, though it is hardly more than half a year, since the Printing and Allied Trades Research Association was recommended to make a full analysis of packaging problems. The concern of Patra was, of course, with packaging composed mainly of paper, board, film and foil, and it was a pity that the stimulus for as broad and deep an investigation into packaging generally, including packaging in cans and

in bottles and in plastics, was not applied. For there is apparent a certain rather unwelcome overlapping in research.

If anyone speaks to-day of the future of packaging—and not least of food packaging—he is met with the word " plastics ". Plastics, we are told, are going to invade successfully every department of packaging from the packing of Spanish olives to the packing of elephants sent across the North Sea to amuse the defeated Germans. There is no doubt that too much has been prematurely claimed for plastics. The needs of packaging are so various and so meticulous that it is almost literally true to say that not until plastics have reached the stage where complete cars and model houses are built of them will they be able to justify the assertions of their more urgent supporters among the fraternity of food manufacturers. Of course, some day we may live in plastic houses and drive in plastic cars, but which of us will live to see that day?

Nevertheless, when this has been said it remains true that plastics have shown, and continue to show in increasing measure, an extraordinary catholicity in their application. It is to be remembered also that, as Mr. Gilbert Beach, Secretary of the British Plastics Federation and Plastic Export Group, pointed out a long time ago, the uses to which the plastic industries' raw materials are put are strictly supervised by the plastics control of the Ministry of Supply. It follows that in conditions of free use their sphere of effectiveness will be largely increased.

Advertising Lost—

To consider the longer prospects of food packaging, it is useful to remember the industry's present subservience to the various Orders of the Ministry of Supply, in particular the Control of Paper Order No. 48. According to this Order, which came into force about the middle of September last, labels are allowed in wrapping or packing articles in connection with their sale, or the rendering of a service for remuneration only (*a*) if they are necessary to identification, transport or use of the package; (*b*) if they are not larger than is necessary for the purpose, with a maximum of 20 square inches, excluding any part containing necessary instructions for use. This touched the matter of the advertising packages profoundly, although it did no more than confirm previous Orders.

Another blow against advertising matter in packages was the ruling that only necessary instructions for the use of the articles may be inserted. I quote a little of this indigestible official wording to show how the problem of the planning of the packaging industry for the future is tied up with advertising values. The food packer knows that intrinsically food packing to-day, with all the stress and limitations of war, is no worse than it was before the war. There have been various substitutions—notably the substitution of lacquered blackplate for tinplate in canning—but, all in all, the margin of safety and the margin of durability in wartime food packs have not suffered appreciably. What has suffered, and to a great extent, is the advertising value of the pack.

And Regained?

I feel that there is a case for some relaxation of packaging restrictions to allow at least for the adequate sustenance of the goodwill value of food manufacturers. This is a matter which within the last few months has been engaging the industry's attention with much force, and the contention of the industry is no less valid because it is patently partially inspired by the interpretation of present military circumstances as indicating the justice of the view that the end of the war will not be reserved for celebration by gentlemen remembering 1939 as the bright period of their schooldays.

From various departments of State there has, since 1943 opened, come more and more optimism than in the rest of the war put together. The Board of Trade and the Foreign Office, two very staid institutions, have spoken of the great opportunities for trade development after the war and of how the function of the relevant Ministries will be to see that nothing impedes rapid revival.

In asking, therefore, for the means to increase the advertising value of packs the food packaging industry asks for nothing at variance with Government doctrine. And the means are, in relation to the total war effort, so trivial.

Question of Supply

A fundamental difficulty in packaging has, of course, been the shortage of raw materials, and it is in this direction, too, that plastics have derived much of their support from the economically-minded.

A word about plastics. Plastics are not quite as new as most people believe. Shellac had a considerable application in the Far East in the years B.C., and thermosetting plastics, on which the major incidence of research has been concentrated, are nearly as old as this century. Plastics also require their raw materials, and it would seem a little wide of the mark to suggest that during this war they are particularly favoured in their sources of supply.

On the production side, too, a main reason why the use of plastics in packaging has not kept pace with the achievements of research is the manufacturing difficulty, and this is not only a matter of introduction of new plant but also of the fact that per unit produced plastics demand an almost uneconomically large production machine.

In the realm of can packs the major difficulties, apart from the absolute difficulty of shipping shortage, were caused by the Japanese infection of the tin-producing areas of the East. The most recent news is encouraging. Bolivia has solved her labour problem and should be sending at the rate of at least 40,000 long tons a year. The Belgian Congo should produce about 25,000 tons annually. Tin production outside the Pacific areas was last year in excess of 85,000 tons, and, other possibilities apart, at least as much may be counted on this year. Meanwhile, the economies effected by the substitution of lacquered steelplate continue to ease the position.

In glass, the problem has been not so much one of the availability of the raw material, as of the twin shortages of labour and operating plant, and the extension of the use of glass packing, which had been looked for by many informed observers when general conditions were militating more powerfully against metal packing, has been prevented by the ratio of traditional demand to wartime productive capacity. There is enough on the glass bottling industry's plate.

Paper packaging has in some respects been the most

delicately placed of all. The Ministry of Production has been forced to go to considerable lengths to effect economies in paper, and it is in this sphere almost more than in any other that the greatest insistence has been placed on salvage. The only ease to the position has been provided by the expansion of the use of straw in place of imported Esparto. More than forty paper mills are now using straw, and the total effect upon the availability of paper for packaging has not been inconsiderable. It may indeed be questioned whether Paper Order 48 would have permitted the retainer to use " such paper as is reasonable for the protection of the goods " if it had not been for the benefit conferred on the general paper position by the use of straw.

Old Wine and New Bottles

In considering the effect of supply difficulties upon packaging generally it is probably no longer permissible to argue that a relative shortage of one type of packaging material may switch the packer to the use of another material, because it seems highly probable that the basic war position of the various packaging materials has now been reached.

In any case, there never was really substantial scope for switching over to new materials. Tin got into very short supply, but it was not possible for the canner of fruits and vegetables to begin packing in paper or board. Nor, despite the full schedule of the glass bottler, was it possible for the brewery to sell its wares in a plastics container (though, of course, there has been some development of the *canning* of beer).

It is certain that the relative settlement of the various spheres of different packaging materials has helped to consolidate planning for post-war development. For so long as the very foundations of packaging were uncertain—when no one could really say whether he would be able to continue to pack in his traditional material for any length of time—it was an essay in optimism to prepare articulated plans for post-war development. Now it is possible to do so, and the question of alternatives enters the picture as a matter of deliberate choice, and not of compulsion.

If a manufacturer has a feeling for the plastics pack it is not because he fears that the Ministry of Supply will shortly be compelling him to use plastics, but because he considers it good policy to concentrate on the development of the use of plastics in the post-war. It is no less true that (and this is the feeling of the packing industry generally) the worst, and indeed pretty well the last, of restriction has been seen. The argument is indeed irrefragable. A food pack must be designed for the security of the contents and for their durability, and for convenience in portability and safety in store, as well as for economy. And there is no doubt that there no longer exists any unnecessary margin in any one of these respects which the authorities could fasten on as a reason for introducing fresh restrictions.

Scope for Innovation

When this is said, however, it remains true that there is some scope, if not for switching among the traditional materials, at least for the adoption of new materials for one or more of the traditional types where they are found suitable; and, more important, it is patently true that the further development of " novel " means of food preparation would automatically compel new types of packs, and here, without the lingering resistance of tradition, is perhaps the main scope for plastics. It is evident that, if dehydration, or the freezing of fruits and vegetables, develops on a scale in accordance with the hopes and expectations of the sponsors, a whole new range of packaging will be brought into being and it will be a matter of course that, relieved from the overriding arguments of existing plant and machinery, such new packaging will represent an entirely free sphere for the full exploitation of the possibilities already opened up by laboratory research.

It should be mentioned in passing that after the war new packaging ideas will in any case have to meet the competition of the return to normal supply of the older materials, whose wartime shortage provided the very soil in which the roots of diligent research germinated. It is interesting to note in this connexion that, as the speech of the Chairman of Compressed Paper Packing, Limited, at the company's annual meeting early in March revealed, there has been something of a revival in the manufacture of cork packings. This company, during 1942, found itself able to secure considerable quantities of granulated cork supplies from Spain and Portugal, on a scale sufficient to make possible commercial manufacture of cork packing on an appreciable scale. This also meant, of course, that the glass bottling industry received an indirect assistance, because the direction of corks is inevitably into bottles.

Packed v. Fresh

An issue of major importance in any consideration of the post-war position of food packaging is whether there is likely to develop a reaction against the use of packed foods and in favour of fresh foods.

Since the war began there has been a great increase in the ratio of packed to fresh foods consumed, and food manufacturers may well consider whether they have to expect, not merely the diminution in demand which will automatically arrive as a result of the cessation of the huge requirements of the Armed Forces and of the official storage of food against an emergency, but also a change in consumer inclination.

This is by no means a simple problem, and so far as the packaging industry is concerned it would certainly be wise to guard against a possible reaction in public taste by, firstly, attempting by brightness and originality in design to take the packed food out of the category of remembered war necessities; and, secondly, to engage in a programme of publicity whose objective is the " packaging education " of the consumer public.

To a considerable extent, of course, the whole future problem of food packaging in the broad economic sense is associated with the problem of the international set-up in the post-war. That is to say, the extent to which packed foods remain as a compulsory proportion in the nation's diet will depend very largely upon the international trade arrangements which Great Britain enters into.

It is plain to see why. It is conceivable that as a consequence of post-war trade arrangements Britain might accept a much larger import of food than the apostles of self-sufficiency believe to be either desirable or probable, and in broad categories imported food means packed food, where its alternative, the native product, would mean fresh food. Or, where the native

alternative was also a packed foodstuff, it remains true that the necessity for large imports would be a stimulus to someone else's food manufacturing industry. And, equally, it is plain that if Britain's dependence on imported food was reduced considerably below the pre-war level that would provide a wider field for the operation of domestic food manufacturers, and in such a case the development of the predisposition of the consumer to buy packed foodstuffs could proceed without influence from factors outside the industry's control.

A Priority Case

The authorities would be wise, therefore, to consider in the framing of trade treaties the question of how far native industries, and prominent among them the food manufacturing industry, have been expanded to serve war needs, and the extent to which their enforced contraction after the war would involve all the maladies associated with redundant capacity and the tight corseting of an industry giving employment to so many and providing a market for so much produce.

To some extent the argument is true that the Government has a special responsibility in this matter because in many directions it has established itself as a monopolistic buyer for the industry. The Minister of Food published an Order making his Ministry the sole buyer of all canned meat products other than meat pastes, fish pastes and soups, produced by licensed canners, as from the beginning of March. And even where no Order similar in scope applies it is generally the fact that the bulk of the buying is done by the authorities, just as it is true that production is tied to the stipulations of the authorities.

The argument that the risk of post-war contraction is a danger which food manufacturers must face philosophically in common with the makers of tanks and planes. munitions and warships, does not bear examination for two reasons. Firstly, because all the industrial concerns engaged in war manufacture have alternative occupations to which they can shift the incidence of production when the war is over—Vickers, for instance, can and does manufacture ploughshares as readily as swords. Secondly, food manufacture is not in reality an industry *per se*. It exists as the final expression of ploughed fields and trim orchards, and its interests are therefore to be identified in the broad analysis with the interests of what is in one sense the ultimate security of this nation.

Tailpiece

In this brief review we have looked at some of the difficulties which the war has heaped upon the shoulders of the food manufacturer. No one will underestimate the ability and energy with which the industry has performed all that has been asked of it.

We have noted some of the problems which must inevitably develop in more or less serious form when the war is over, and which it is therefore necessary to grapple with now as far as possible. It would be ungracious of me to suggest that the house of food manufacture could be put a little more in order. But it is true, as I visualise the trend of affairs, that complete unanimity now in the interpretation of future difficulties and on the means by which they may be combated would be an investment for the future of inestimable worth.

Eels as Food

FROM a nutritional aspect the eel is at the head of the list of fish produced at home, either in fresh or salt water, states a notice issued by the Ministry of Agriculture.

There has always been a steady demand for eels in this country. In the years preceding the present war about 2,000 tons of eels were imported from abroad (chiefly from Denmark) and from Ireland (mainly from the River Bann in Northern Ireland). The supplies caught in Great Britain itself were almost negligible by comparison.

Almost immediately after the outbreak of war the Ministry initiated a campaign with the object of encouraging people to catch eels, to make good, so far as it was practicable, the loss of supplies from abroad, and of exploiting to the fullest possible extent the naturally existing eel fisheries of this country.

The main fishery, and economically the most important, is that of the silver, or seaward migrating, eels, which descend the rivers in the autumn. They are in their prime; and as they never return it is clearly of importance to make the most of the opportunity of taking them while still in fresh water.

As an inducement to those concerned the Ministry offered a loan, interest free, of half the sum required in every case to install, or recondition, traps and fixed nets used for intercepting these silver eels, repayment to be made from the profits secured.

The other kind of eel fishery relates to the brown, or still feeding, eels. These are to be caught by various methods in the waters where they are found. Though immature it does not follow that all brown eels are undersized and accordingly not worth taking, many of them being upwards of 1 lb. in weight and nearly as nutritious as silver eels.

The Ministry introduced what is known as the Dutch fyke net as an instrument for the capture of this class of eel. The waters most suitable are those with a slow-flowing current and not subject to violent fluctuations in level, where the nets can be set without risk of loss or damage. This is a useful alternative to the traps and fixed nets used for taking the silver eels, where—for one reason or another—the means available for intercepting the latter are absent or inadequate.

The supply of marketable eels depends on an annual stocking with elvers, which are the progeny of the silver eels and which ascend the rivers of Europe every spring from the breeding grounds of the eel in the Atlantic. The rivers of the west coast of Great Britain and, particularly, of Ireland, being first in the line of route, receive the main volume of this elver migration. By the time the east coast has been reached the elvers are appreciably reduced in numbers. This also applies to the Atlantic coast of the European continent. The circumstance accounts for the fact that the Germans established an elver-collecting depot at Epney-on-Severn, where annually, in the years preceding the present and the previous war, several million elvers were collected and shipped to Germany to stock the naturally understocked waters of that country.

This depot is now under the control of the Ministry, elver distribution being a logical corollary of eel fishery maintenance and development. A limited distribution of elvers during the coming spring of the current year is being undertaken by the Ministry.

Preservation Freezing of Apricots for Subsequent Processing

M. A. JOSLYN

(Division of Fruit Products, University of California, Berkeley, California.)

THE successful preservation of apricots by freezing is more difficult than that of other fruits (*e.g.*, berries), and much loss has been encountered by the inexperienced packer in the past. No entirely satisfactory process of freezing the available varieties of apricots has been developed. Frozen apricots are particularly susceptible to browning and discoloration on exposure to air; enzymatic oxidation occurs slowly during freezing storage at 0° F. and very rapidly and extensively after defrosting and thawing to room temperature. A marked softening in the texture of flesh occurs on freezing, and this accentuates the toughness of the skin. In the canned fruit the peel is so thin and cooks so tender that it is not noticed appreciably when eaten. Pre-freezing treatments are available for reducing or preventing enzymatic oxidation, with consequent changes in colour and flavour, but no satisfactory treatment for texture retention is known. Fortunately, texture retention is not so important in apricots to be frozen for subsequent processing. The pre-freezing treatments are not universally applicable for all processing (canning, baking, jam-making, etc.) and vary in efficiency and cost. The information obtained in our laboratory as a result of several years' observations, in the field and from other sources, is summarised here for the benefit of those who are planning to freeze apricots.

Prevention of Discoloration

The undesirable discoloration and off-flavour production may be prevented permanently by exclusion of oxygen, or by heat inactivation of the oxidising enzymes. It can be prevented temporarily by the addition of chemical inhibitors such as sulphurous acid or sulphites or thio-urea (also known as thio-carbamide); and it can be reduced by addition of sugar or syrup, which may act both as a mild inhibitor of enzyme activity and as an agent to reduce contact of fruit tissues with oxygen. The commercial practice in the past for the preparation of apricots for bakers' use has included (1) water blanching, (2) treatment with sulphurous acid solutions, (3) sugar pack. The possible treatments will now be described and recommendations made as to their suitability for freezing apricots for a particular use.

Steam Blanching

The heat inactivation of enzymes may be best carried out by steaming the fruit so that it is heated throughout to a temperature high enough and for a time long enough to destroy the oxidising enzyme completely in all parts of the tissue. Merely destroying the enzyme at the surface of the fruit is not sufficient, since browning will occur in the centre portions of the fruit on defrosting. Steaming is preferable to water blanching, as it results in less loss in water-soluble sugars, salts and vitamins; the steamed fruit is also not as watery in flavour and consistency. The temperature to which the fruit tissues must be brought varies with the variety, maturity, size of fruit and conditions of blanching (particularly heat transfer factors). Heating the fruit in free-flowing steam throughout to a temperature of at least 185° F. is necessary to destroy the oxidases, according to Sorber. We have found somewhat lower temperatures satisfactory, but agree that halved medium-sized apricots should be steamed for not less than 4 minutes when exposed in a single layer. As a test for the adequacy of scalding, select a few fruit from the blancher, cool to room temperature, cut across, place in a saucer and add several drops of a 1 per cent. tincture of guaiacol or a 1 per cent. freshly prepared tincture of guaiacum. If these change in colour in 5 minutes (guaiacol to red, guaiacum to blue) the blanching has not been sufficient to destroy the oxidases.

To obtain uniform heat penetration the fruit should be blanched in a single layer on a wire mesh belt, or on wire mesh or slotted wooden trays placed on a conveyor, running between rather closely spaced steam jets, preferably placed both above and below the conveyor. To aid in subsequently removing fruit from trays, it should be placed cups (cut surface) up. The belt conveyor is enclosed in a long open-end steam tunnel or exhaust box. The conventional pie foundry or continuous exhaust box may be used.

Air Cooling

After blanching the fruit should be cooled in a blast of air from a fan played across a conveyor leading from the exhaust box (if a belt blancher is used) or against a stack of trays. This accomplishes two purposes—removal by evaporation and blowing off of surplus moisture and partial cooling of the fruit. Agitation during air cooling further increases the removal of surplus moisture. The air-cooled fruit, free from excessive moisture, may then be frozen in a single stage or preferably a two-stage system. After freezing it may be packaged in light containers of paper, wood or tin, sealed and stored at 0° F. Warm fruit should not be packaged in large containers before freezing. If the fruit is cooled to about 35° F. before freezing, the refrigeration load on the freezer (tunnel or cabinet type) is reduced and less frost accumulates on the freezer coils.

If firm, ripe fruit is used, the fruit will retain its shape during blanching and freezing. Soft, ripe fruit cannot be handled as conveniently by this method. Such fruit may be best frozen in *purée* form. The steamed halved fruit has been used for bakery products (pies, etc.) and is satisfactory for jams, preserves, ice-cream flavour and for baby food.

Water Blanching

Water blanching is not as satisfactory as steam blanching because of the greater loss of soluble

materials by leaching. Heat penetration in boiling water is more rapid and uniform than in steam, and by using a limited quantity of water in blanching several lots of fruit loss of solids by leaching may be reduced. We have found that when the water is boiled briskly and allowed to circulate freely about the fruit a blanching period of 3 minutes is sufficient. A small covered blancher just deep enough to hold a perforated metal basket (30 lbs. or so), with a large steam distributor capable of maintaining the water in a freely boiling condition and holding the minimum quantity of water to cover the fruit, is best. If the fruit is well washed, the water in the blancher may be used for blanching a number of times, and will build up in solids content, so that loss by leaching after the first few batches will be small. The blanched fruit may be drained, placed on trays, air cooled and frozen. It may also be cooled in ice water, taking care to minimise leaching by using a small volume of ice water. Refrigerated water would be preferable. Another method of minimising leaching during cooling is to use cold 15° to 25° Balling syrup as a cooling medium. Water-blanched fruit is usually too watery in flavour and much softer and more broken down in texture. It was used for pie stock, but is too watery and lacks flavour for use in baby foods and preserves.

Syrup Blanching

The texture of the fruit and its flavour may be well preserved by blanching in a 15 or 25 per cent. sugar syrup. If firm, ripe fruit is used and quickly heated, cooled and frozen, the texture is satisfactory for subsequent use in fruit salad pack. The individually frozen halves may be placed in the can while still frozen, maraschino cherries, pineapple, peaches, pears added in the usual proportions and the product exhausted, sealed and canned. Fruit so treated is of better colour, flavour and texture than when it is repacked from No. 10 cans. There is no loss due to handling, so that this process should be more economical. We have obtained excellent results by blanching halved apricots in a 25° Balling syrup heated to near the boiling point for 3 minutes, draining, cooling in air on trays and tray-freezing. The halves must be placed with cut surfaces up, as otherwise they will freeze fast to the trays and considerable difficulty will be experienced in removing them.

Instead of cooling in air before freezing on trays, the syrup-blanched fruit may be cooled in a cold-syrup bath, drained well and frozen rapidly. Two syrup tanks, one for blanching and the other for cooling, with conveyors in each, may be used for continuous operation. The fruit should be heated by means of a hot syrup spray as it enters the blanching tank to expel the air in the fruit and permit it to sink. The syrup in the blancher should not be allowed to become too concentrated (not over 25° Balling) and should be heated above 200° F. with steam coils. The cooling bath should be refrigerated with brine or ammonia coils. If live steam is admitted directly into the blancher or ice added to the cooling syrup, a dilution of the syrup occurs and more sugar will have to be added to maintain the concentration.

Sulphurous Acid (SO_2 Solution) Dip

The discoloration and browning of frozen apricots to be used in pie baking and in jam and preserve manufacture may be retarded by treating the fruit with a weak solution of sulphurous acid or its salts. The most practical source of sulphurous acid is liquid SO_2, which may be used as such or as a freshly prepared stock solution containing 6 per cent. of SO_2. The strength of the treating solution and the time of treatment will vary with the maturity of the fruit, air-tightness of the container and length of storage period. The absorption of SO_2 by halved unpeeled fruit is slow. In our earlier investigations we found that fruit treated for 5 minutes in a 0·3 per cent. solution of SO_2 contained only 25 p.p.m. of SO_2. While this amount prevented browning in sealed cans during a short storage period, larger amounts are necessary for longer storage. About 40 to 50 p.p.m. are necessary for colour retention for three years at 0° F. in sealed cans, and about 75 p.p.m. for colour retention in 30-lb. tins where fruit is exposed to air. At the latter concentration the fruit will not discolour during defrosting and storage at room temperature for 24 hours. This concentration in the fruit is obtained by dipping the fruit in a 0·4 per cent. solution for 4 minutes or in a 0·5 per cent. solution for 3 minutes. When the concentration of SO_2 in the fruit tissues is much above 75 p.p.m., the fruit has an objectionable "sulphury" taste and may retain this flavour in pie even after baking. Commercially the best results have been obtained by immersing the halved fruit in a 0·4 per cent. solution for 4 minutes.

Preparation of SO_2 Solution

The dipping solution is most conveniently prepared by running the liquid SO_2 directly into the bath from a cylinder through a regulator which measures the liquid out by volume or weight. The treating bath should be of wood and contain no iron parts. The liquid sulphur dioxide may be led into the tank through a copper coil (a glass or rubber tube may be used). The treating solution should be cooled with ice or otherwise refrigerated. The evaporation of sulphur dioxide fumes is less from a cold solution, thus making it more comfortable for the worker; and the fruit loses some of its heat, so that refrigeration load is decreased in freezing. The solution should be maintained at proper strength by periodically running in more SO_2. A preliminary run in which the solution is titrated periodically should be made at the start of the season to determine the rate at which the SO_2 content of the solution is depleted by absorption by the fruit and loss by evaporation. Loss by absorption is small; in one experiment 7,000 grams of fruit were dipped into 12 litres of 0·4 per cent. SO_2 solution, and the SO_2 content of the solution, after treatment, had decreased but a few hundredths per cent. The treating solution should be placed in a well-ventilated portion of the plant, where the prevailing draught will blow the fumes away from the workers.

The cut fruit may be placed in open-weave Chinese baskets and dipped into the solution up and down to insure good circulation about each piece of fruit, or it may be conveyed through the solution on an open-weave belt conveyor. Metal equipment should not be used in handling the fruit or solution, and the hands of the workers should be protected by rubber gloves.

After dipping, the fruit should be well drained. If packed with too much solution adhering to the surface, the SO_2 content of the fruit will easily reach and exceed 150 or 175 p.p.m. Prolonged draining is not desirable, owing to loss of SO_2 by oxidation or volatilisation. The drained fruit is packaged in wooden barrels, paraffined

TABLE 1

COMPOSITION AND CONSISTENCY OF APRICOT PULP

Pulp.	*Total Solids.*	*Water-Insoluble Solids.*	*Soluble Solids, as Sucrose (R.I.).*	*Soluble Solids. By Difference.*	*Alcohol ppt. (Total.)*	*Consistency.*
	Per Cent.	*Per Cent.*	*Per Cent.*	*Per Cent.*	*Per Cent.*	
4+1 frozen *purée* From sulphited halved Royal ...	33·1	0·35	31·4	32·7	0·84	11
From canned Blenheim ...	16·4	1·33	13·7	15·1	1·25	5·5
From canned Tilton	17·3	1·97	13·7	15·2	1·08	2·0–2·5
	15·5	2·00	13·2	13·5	1·05	2·0

paper containers or enamel-lined tin cans. Plain tin cans should not be used. The packaged fruit is then frozen and stored at 0° F.

The sulphited fruit cannot be used in products like canned fruit salad or baby food because the sulphur dioxide present will attack the tinplate and in turn be reduced to objectionable hydrogen sulphide. It can be used in making jams, preserves and in baking.

Other Chemical Treatments

In addition to sulphur dioxide, other enzyme inhibitors may be used: thiourea, salt, citric acid, hydrochloric acid, sugar, etc. Some of these are not as efficient save at higher concentration (sugar); others may be harmful to health or otherwise objectionable. Of those listed, thiourea is best. Denny reports good colour retention in sliced fruit dipped in 0·1 per cent. thiourea solutions for 2 minutes. The flavour of such treated fruit is not objectionable.

Sugar Pack

The conventional sugar pack is prepared by sifting dry sugar with the pitted halves in such a way as to obtain uniform distribution of sugar throughout the pack. The fruit-sugar ration for apricots is usually 3+1 or 2+1, although higher ratios may be packed for the trade. The lower the sugar content and the less uniformly it is distributed, the poorer the keeping quality. A combination heavy syrup and dry sugar pack may be used.

Baby Food Requirements

The chief apricot product formerly used in preparation of sieved baby foods was solid pack ice. Some fresh fruit and dried fruit also was used. The relatively short producing season for the fresh fruit restricted its use, particularly since most baby foods are packed in Middle West and Eastern United States. The high sulphur dioxide content of the sun-dried fruit of commerce restricts its use in canned baby foods unless it is treated in some way. It is possible to dehydrate fresh apricots and preserve them at 32° F. with little or no SO_2 for a short period of time, but such a procedure is not practical. Apricots are much too tart to be used alone in baby foods and are usually mixed with apples. The consistency of the resulting *purée* is largely determined by the consistency of the apricot and the apples used in the product.

Some idea of the differences in consistency to be expected in crushed or sieved apricot prepared from various apricot products is shown in Table 1. There the *purées* obtained from frozen fruit and from solid pack pie fruit are compared. The fruit (except the frozen *purée*) was pulped in a Rietz disintegrator, using a ¼-inch screen. The consistency was measured as the distance of flow in 30 seconds in a Bostwick consistometer. The greater the distance of flow, the thinner the product; thus the frozen *purée* was very thin, even though it was high in solids content. The consistency seems to be more closely related to the water-insoluble solids content, increasing (reading decreases) as they increased. The total pectin (both soluble and protopectin) and gum content as measured by alcohol precipitate did not parallel the consistency readings as well, although the pectin content is known to influence the consistency of many fruit products (particularly tomato products and fruit pastes and jams).

The pulp obtained from halved Royal apricots was found to increase in consistency on heating from a value of 5·5 for unheated to about 4 to 4·5 for pulp boiled for 6 minutes. This increase is probably due to solution of protopectin. The consistency of two different brands of prepared apricot-apple sauces was found to be 4·5 and 6·0.

Halved Fruit

Halved fruit (irrespective of the pre-freezing treatment) suffers further breakdown in texture on freezing. If such fruit is defrosted and allowed to drain it will lose weight owing to exudation of a thick gummy juice. The amount of such drainage is shown on Table 2, obtained on firm, ripe Blenheim apricots stored at 0° F. since 1938. Although steaming or heating in boiling water or syrup reduced loss on draining, in comparison with the untreated or sulphited fruit there is a considerable loss in "juice".

This breakdown in texture can be reduced by more rapid freezing and by use of riper fruit. It explains why some packers have found frozen halved fruit to be too "watery" for use in canned sauce. The exudate, however, should not be discarded, as it contains dietetically important nutrients (sugars, minerals and vitamins). The better retention of juice in canned solid

TABLE 2

DRAINED WEIGHT OF 1938 APRICOTS

Treatment.	*Bal. Drained Juice.*	*Loss in Weight on Draining.*
		Per Cent.
Plain	14·3	38·7
Steamed 4 min. ...	14·5	22·9
Boiling water 3 min.	14·0	25·1
Boiling 25° Bal. 3 min.	16·5	22·5
5,000 p.p.m. SO_2 5 min.	14·0	34·7

pack pie is due in part to the softening of the tissue during the prolonged heating and the formation of gels capable of retaining moisture from protopectins, hemicelluloses and other gums. Although the bulk of the fruit used in the canned pie pack is soft, some green fruit is used also, and the latter improves the texture of pack owing to its higher content of protopectin. It is, however, possible to obtain a *purée* of desired consistency from soft, ripe fruit. A canned *purée* prepared from soft, ripe apricots, steamed and pulped hot, had a consistency of 3 to 3·5 and a total solids content of 18·1 per cent.

Frozen Purée for Baby Foods

Since apricots for baby foods are pulped and strained before canning, a frozen *purée* is just as satisfactory as the frozen halved fruit. For satisfactory consistency the pectic enzymes, which would hydrolyse pectin as well as the oxidising enzymes, must be destroyed by heating. Such fruit, when pulped hot through a rather coarse screen (¼-in. to ½-in. mesh), will be high in pectin- and water-insoluble solids. The fruit, after sorting and washing, may be scalded whole—a period of 6 minutes or somewhat longer is necessary to obtain complete heating of the whole fruit—and pulped hot. This procedure saves the cost of hand-cutting the fruit and is more practical for soft fruit. The fruit, after steaming on a conveyor belt, should be passed over a perforated belt under a strong fan to remove superfluous moisture and to partly cool the fruit. The pulp may be frozen to a slush in a continuous tubular positive-feed freezer such as the Vogt continuous ice-cream freezer and then packed into cans and stored at 0° F.; or it may be brought to 35° F. in a refrigerated coiled vat, packed into 30-lb. paper containers or barrels and frozen. Hot pulp should not be packed prior to freezing because of slow heat transfer and danger of spoilage. The container should not be filled too full of unfrozen pulp, and headspace (about 10 per cent. by volume) should be allowed for expansion on freezing.

Such frozen pulp will retain its colour and flavour during freezing storage and subsequent processing, and is excellent for use in flavouring ice cream, ices and in making jam.

Pie Bakers' Requirements

The pie bakers require halved fruit which will retain its colour during preparation for baking. The fruit must also retain its texture well enough not to collapse during baking. For this purpose steam blanched or syrup blanched fruit is best. The sulphited fruit, although it is of excellent colour and flavour, collapses on baking unless it is given a pre-treatment. Frozen fruit must be completely defrosted before use in pie and should be sweetened to the desired degree with sugar. The sulphited fruit is best prepared by mixing the dry sugar with the frozen fruit in a kettle, allowing the frozen fruit to thaw out and absorb the sugar, and then bringing the mixture to a boil. This will expel the air present in the fruit tissue and prevent collapse in baking. Pies of superior apricot flavour may be made by withholding some of the apricot syrup and pouring in half a cupful or so of this juice through a hole in the top crust just as the pies are removed from the oven. The volatile apricot flavour is then not baked out.

Frozen Apricot Purée

Frozen apricot packed in small packages for retail distribution of satisfactory flavour may be prepared from quartered or sliced ripe fruit mixed with sugar (4+1) or preferably covered with a 40° syrup. Such fruit, when allowed to defrost in the household refrigerator overnight and served just before all ice has melted, is acceptable as dessert. On complete thawing and exposure to air at room temperature the apricots will darken and acquire an oxidised off-flavour. The tough skin in such a product also is more objectionable in the completely defrosted fruit. If the fruit is pulped before freezing and mixed with sugar or heavy syrup in the proportion of 4+1, taking care to minimise exposure to air during processing, more flavour is retained and the objection to the texture eliminated. Such fruit must be frozen in tightly sealed full containers or covered with a layer of syrup to reduce surface oxidation. It is excellent as a topping for ice cream, in sauces and as a frozen dessert and for flavouring frozen dairy products.

For use in commercial ice-cream manufacture, however, the pulp prepared from steamed fruit pulped hot is superior in initial flavour and in keeping quality. Several tastings of apricot ice cream prepared from fruit processed in various ways have shown definitely that in order of superior flavour these are: canned sweetened apricot pulp, frozen sweetened apricot pulp prepared from steamed or syrup blanched fruit, frozen unheated sweetened pulp, frozen sliced fruit with sugar (4+1).

The frozen sweetened *purée* may be used in preparing apricot nectar or other beverages in the home and in the cannery. For home use a delicious beverage may be prepared by dropping a pint of frozen pulp into a quart of dilute syrup flavoured with a little lemon juice and stirring.

Varieties

The varieties of apricots grown in California in order of importance are Royal, Blenheim, Moorpark, Tilton, Hemskirke, Rontiers Peach and Newcastle. The principal varieties used for drying are the Royal, Blenheim, Tilton and Moorpark. The Blenheim is the most popular variety for canning; the Royal is next best. Diehl, Wiegand and Berry reported that the Tilton variety was most satisfactory for freezing in the Pacific North-west, although Royal and Blenheim were also satisfactory, the colour of the former being especially

attractive. Diehl *et al.* found that a Blenheim-Tilton cross was superior to Blenheim or Moorpark in California. In our tests we find Royal or Blenheim to be satisfactory and superior to Tilton or Moorpark. The Tilton is inclined to be somewhat more fibrous and is apt to be picked too green because it colours in advance of ripening. In the present emergency, however, the Blenheim and the Royal varieties, particularly those grown in the San Francisco Bay or central coast district, which are usually utilised for canning, will be the varieties that should be frozen.

BIBLIOGRAPHY

Cruess, W. V., E. L. Overholser and S. A. Bjamason : Storage of Perishable Fruits at Freezing Temperatures, *California Agr. Expt. Sta. Bull.* **324**, 25-43. 1920.

Cruess, W. V., and G. L. Marsh : Utilisation of California Fruits, *California Agr. Expt. Sta. Circ.* **349**, 1-53. 1941.

Denny, F. E. : Inactivation of the Browning System in Frozen-Stored Fruit Tissue, *Contrib. Boyce Thompson Inst.*, **12** (4), 309-320. 1942.

Diehl, H. C., W. T. Pentzer, J. S. Berry and C. E. Asbury : Suggestions for freezing foods are outlined, *Western Canner and Packer*, **26**, No. 5, 31-33; No. 6, 39-41; No. 7, 33-35; No. 8, 43-44. 1934.

Diehl, H. C., E. H. Wiegand and J. A. Berry : Preservation of Fruits and Vegetables by Freezing in the Pacific North-west, *U.S. Dept. Agr. Mimeo MC-53*, pp. 1-58. April, 1939.

Joslyn, M. A. : Preservation of Fruits and Vegetables by Freezing Storage, *California Agr. Expt. Sta. Circ.* **320**, 1-35. 1930.

Joslyn, M. A., and E. M. Mrak : Prepared Fresh Apples for Bakers' Use, *Fruit Products J.*, **9**, No. 10, 309-311. 1930.

Joslyn, M. A., and E. M. Mrak : Investigations on the Use of Sulphurous Acid and Sulphites in the Preparation of Fresh and Frozen Fruit for Bakers' Use, *Fruit Products J.*, **12**, 135-140. 1933.

Shear, S. W. : Deciduous Fruit Statistics, *Univ. Calif. Giannini Foundation, Mimeo Rept.* **89**, 6. 1940.

Sorber, D. G. : Personal Communication. 1942.

Western Canner and Packer: Thirty-First Year-Book and Statistical Review Number. April 25, 1941.

ACKNOWLEDGMENT

In obtaining the original data on which this article is based the author had the assistance of C. L. Bedford during the years 1937-40 and of S. B. Kilner in 1941. He was also offered the use of a summary on freezing of apricots prepared by D. G. Sorber. This was found useful in outlining the various aspects.

Control of Food Patents

S. T. MADELEY

OUR NATIONAL survival depends to no small extent on our treatment and preservation of food. This relies in some cases on the handling of patented articles and processes. A great deal can be done by the Government through wise provisions in the Patent Acts and Rules to foster that encouragement of invention which is the very essence of progress.

New Patent Act

In the earlier part of 1942 a new patent Act came into force, as did a new Board of Trade licence relating to patents, some aspects of which will be examined below.

The table shows annual numbers, as estimated by the author, of British patents granted during the period 1932-41 relating to food preparation.

Very significant are a trough in 1933 after the slump and the peak of 1937, when the present world crisis was getting under way.

Year.	*Patents.*	*Year.*	*Patents.*
1932	37	1937	60
1933	17	1938	42
1934	24	1939	43
1935	38	1940	41
1936	32	1941	56

Typical Patents

Two typical patents are given below :

544229 (Hardy and Cutting). This is an apparatus for controlling the flow of gases through food-drying and smoking kilns or chambers. The apparatus is provided with a chimney and a circulating valve on the suction side of a chamber through which the gases are forced in a uniform flow. The gases are propelled through a diffusion wall, which is made of substantially parallel strips of material. Slots are provided in the wall and are so spaced and graded in size that the gas issuing from the slots cools a short distance therefrom to form a uniform column of gas flowing at uniform speed.

544490 (National Oil Products Co.). A vitamin composition suitable for mixing with poultry and cattle feeds. The substance contains a high content of vitamin A. Saponification of oils containing fat-soluble vitamin and recovery of the unsaponifiable portion yields a concentrate of fat-soluble vitamin such as C, B_1, B_6, and G, having a specific gravity between 43° and 45° Bé. The composition contains more than 30,000 A units per litre.

Obviously enough, in order efficiently to carry out inventions such as the above, a highly trained technical staff, centralisation, and well-constructed plant are necessary, to say nothing of sufficient capital. Many a good invention has been stifled at birth for lack of the last. If such a shortage occurs in the mature years of a patent, when most profit should be made, the outlook is indeed bleak. Such a state of affairs is now upon us; a patent may in effect be docked of five or more years of its life. That is where Section 18 (6) and (7) of the Patents, etc., Acts (1907-42) comes in.

Before proceeding further to examine this Act, the Patents, etc. (Emergency), Act, 1939, may be called to mind.

Revocation of Enemy Patents

Section 1 of this Act empowers the Comptroller to revoke or vary a licence under a patent owned by an enemy or an enemy subject, say for the preparation of a vitamin. By Section 2 he can grant an emergency licence under a similarly owned patent. Section 4 keeps in force the International Convention whereby priority of date is, under certain conditions, granted to applications from abroad. This is, however, now much curtailed by the 1942 Board of Trade Licence, which restricts payments, incoming or outgoing, to patents, etc., renewal fees, in usual cases.

Section 6 enables the Comptroller to grant extensions of time for filing patent, etc., documents, paying patent and similar fees, where delay has arisen out of the war and he thinks such extension desirable. This section is in part incorporated in subsection 91 B of the 1942 Act. Subsection 91 C of this Act under certain conditions protects a subsequent patent application when prior exchange of information in articles thereunder has taken place between the British Government and a reciprocating country.

Government Powers

Section 29, as amended by the 1942 Act, when read in conjunction with Rules 3 and 4 of the Statutory Rules and Orders 1780 of 1941 (Defence, etc., Regulations, 1941), in brief, makes it clear that the Government has powers to do what it likes, for war purposes, with any invention it is aware of on terms to be settled by agreement now or by post-war tribunal. It can also direct the possessor of any relevant information to disclose the same to its agents and authorises the use of such information for purposes of the war by such agent. Purchasers of Government stock made under this section, and no longer required, are protected. Also, the Government can collect anticipatory material from its own and other sources to assess the value of a patent from the point of view of remuneration. In fairness, it must be stated, however, that Rule 3 also protects the patent application from invalidation by prior disclosure to a Government agent under this section.

The present attitude of the Government towards patentees appears to be that it makes its contracts with whom and where, here and abroad, it will; and that it is not bound to give a contract to a patentee under his own patent. Dispute as to remuneration under the patent will not debar the said patentee from getting an " ex-royalty " contract.

Existing Agreements

The aforesaid Rules enable the Government to override any existing agreement or licence. Government contractors are not allowed without prior departmental consent to charge the Government for royalty payment under such a licence, and indeed are relieved of that royalty liability by their Government contracts. They must inform the Government of any royalty clauses in their licences, and the patentee will have to claim against the Government. Departmental contractors must also inform the Government of any patents they want to use.

An emergency licence voids a subsequent licence granted by another than the Comptroller, unless his permission (which is open to opposition) has first been obtained.

The Comptroller may prohibit or restrict, at the request of the Government, disclosure of information as to a patent application, in accordance with Rule 3. Under the same Rule permission has to be obtained from him before making patent applications abroad.

Servants of the Crown may file their own patent applications, but should obtain the consent of the heads of their department or of their commanding officers before proceeding further or before employing a patent agent.

By S.R. and O. 1882 of 1942 the situation is further complicated. According to these regulations, the Government can require a resident of the United Kingdom who has interests in an invention, discovery or design in the U.S.A. to grant a licence in respect of use thereof (*i.e.*, making, using, vending the invention, etc., or products, etc., made by its use) to the Government or its agents, subject to compensation. Without Government authority no such resident may disclose information facilitating manufacture of any article in the U.S.A. Furthermore, the said resident may not, without permission of the British Government, transfer any rights or grant any licences or other interest relating to use as above defined in the U.S.A. This applies to future as well as present possibilities.

Prolongation of British Patents

A 1942 judgment laid it down that where a patentee seeks a prolongation of his British patent he must disclose what he has made out of his corresponding foreign patents to enable the Court to decide on the question of an extension under Section 18 (6) and (7). Between two and three years' extension was granted.

The practice now is, in ordinary cases, to grant an extension equal to the period between the beginning of the war and the expiration of the patent. Such prolongations only take account of damage to date, and further extensions may be applied for.

A later judgment in the same Court concerning a batch of patents which had been made secret under Section 30 of the Patent, etc., Acts, assigned to the Crown and reassigned to the inventors, eventually stated that a Service inventor should not be considered as in a worse position than an ordinary employee who has contracted with his employers concerning the inventions he has made during his work. Also that the Court will not review the terms of an agreement, alterable by a specified Secretary of State, concerning the division between the Crown and an inventor of the benefit accruing from commercial exploitation of an invention. In Section 30 cases, petitioners cannot rely on assignments to the Crown having deprived them of the chance of exploiting their invention during the assignment. The Court will not consider whether a payment offered or made to an inventor is adequate where Treasury Regulations cover it. The Crown need not assess the value to it of an invention during a period when the invention has been vested absolutely in the Crown. Eight-year prolongations were granted in this case.

A Simple Photoelectric Absorptiometer

Those accustomed to the use of a photoelectric absorptiometer will not need to be reminded of the great variety of uses to which it may be put in routine analysis and control. Those not yet familiar with that instrument do not always realise how much may be done with improvised material which may be found in most laboratories. The following description of a home-made absorptiometer with an account of some of the work which has been done with it may therefore be helpful to those who are working under conditions of wartime restriction when best use has to be made of what is at hand.

A. H. STUART, Ph.D., B.Sc.

THE apparatus consists of a box divided into three compartments. In the upper compartment is a lamp (L in Fig. 1), the light from which passes through a diaphragm (D_1) to the middle chamber of the box which carries a 50 c.c. Nessler tube (N), which is kept centralised by resting in a collar not shown in the figure. The light, having traversed this tube, passes through a second diaphragm (D_2) and impinges on to a photoelectric cell (C), the response of which is recorded on a microammeter (A).

If a measured quantity of some liquid such as water is placed in the Nessler tube, the reading of the microammeter can be brought to a convenient magnitude by the choice of a suitable lamp (L), the fine adjustment being made by means of a rheostat as shown in the figure. If a voltmeter is placed across the terminals of the lamp and its reading maintained constant by means of the rheostat, any fluctuations in the mains voltage can be corrected.

If, then, a trace of any suspended matter is introduced into the water, some of the light will be absorbed during its passage through the Nessler tube and the microammeter will record a lower reading. By taking a few readings from dispersions of known concentration, a calibration curve can be obtained which can then be used for routine tests on that particular type of dispersion.

Example of Application

Two such calibration curves are shown in Fig. 2. Both these graphs refer to graphite suspended in water. The graph marked **A** was obtained from a dispersion of very finely divided graphite of colloidal dimensions, while graph **B** shows results given with a graphite dispersion in which the particles were somewhat larger but still small enough to remain in suspension for a long time. It will be seen that the smaller the particle size the more sensitive is this method of estimating concentration. In practice, this instrument gave consistent results with dispersions of graphite having concentrations as low as one part in three million.

If the suspended particles have any characteristics of shape or magnetic properties it may be possible to use the instrument as a means of identification in very low concentrations. For example, graphite crystallises in the form of flat, hexagonal plates, and while it is well known that graphite is diamagnetic, it is not always realised that the diamagnetism is anisotropic. The result is that, when free to move, graphite crystals will align themselves, no matter how small they may be, in a magnetic field with their basal planes parallel to the direction of the magnetic field. Hence, if we enclose the Nessler tube in a coil carrying an electric current so that the lines of force are parallel to the axis of the tube, the suspended graphite crystals will align themselves so as to pass more light than when the crystals are dispersed haphazard.

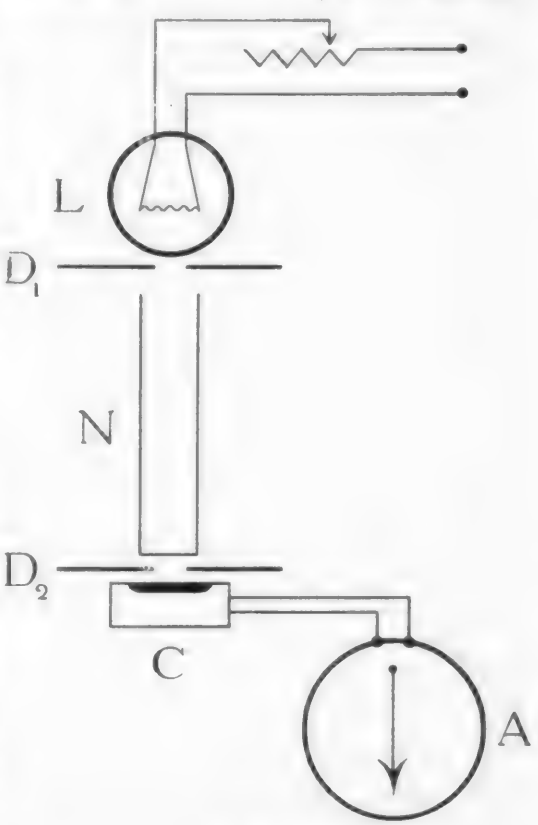


Fig. 1.

In one such test a coil of 800 turns was used and the exciting current was 3·7 amperes. Under such conditions the imposition of the magnetic field caused an increase of just over 4% in the transmission of light when the graphite concentration was one part in three million and more than 32% when the concentration was one part in 300,000. Thus this method affords a ready means of distinguishing between true crystalline graphite and amorphous carbon when the amount present is too small to be detected by any other means.

Quantitative Estimates of Metals, etc.

In addition to the use of this instrument in problems of turbidity it may also be applied to true solutions where depth of colour is frequently a function of concentration. Thus, it has been employed in engine tests where the question of the wear of bearings has been under investigation. In engines with forced lubrication, wear of the metal parts is indicated by the presence of the removed metal in the oil. If a measured quantity of this is calcined and the ash dissolved, the presence of iron will be indicated by the coloration produced by the addition of potassium thiocyanate. If the instrument has been calibrated by this test on standard ferric solutions, a direct reading of the amount of iron present in the oil can be obtained in a few minutes. As only a few drops of oil are required for the test it is possible to extract samples during the running of the engine test, and thus obtain evidence of any variation in the rate of wear. The quantitative estimation of most metals and many non-metals can be carried out by a modification of this method.

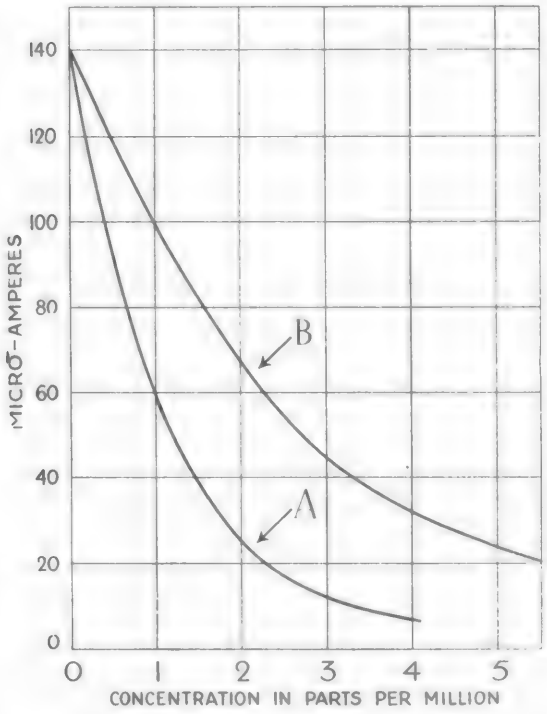


Fig. 2.

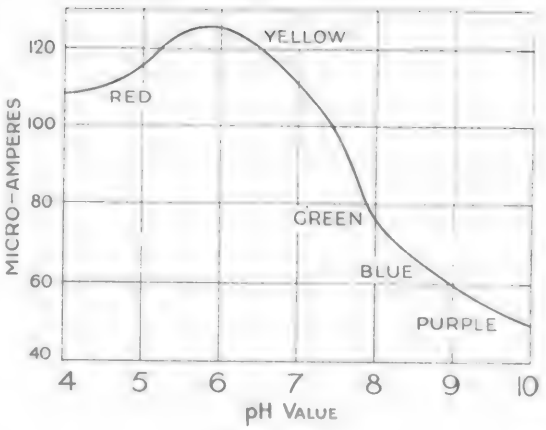


Fig. 3.

Determination of *p*H

Another application of this instrument to routine tests has been the determination of *p*H values by means of indicators. Readers will be familiar with the B.D.H. indicators. The universal indicator gives a range of colours more or less corresponding to the spectrum of white light, starting with red for a *p*H value of 3 to violet with a *p*H value of 10, and an approximate *p*H value of a fluid may be obtained by the use of the following table which is supplied with the indicator:

*p*H = 3·0	Red.	*p*H = 7·0	Greenish yellow.
4·0	Deep red.	8·0	Green.
5·0	Orange red.	9·0	Greenish blue.
5·5	Orange.	9·5	Blue.
6·5	Orange yellow.	10·5	Violet.
6·5	Yellow.		

Visual observation of colour is never very satisfactory, and a much more reliable use of this indicator is to calibrate the absorptiometer by means of a series of liquids of known *p*H value. Fig. 3 shows the calibration curve obtained with the B.D.H. universal indicator, and it will be readily seen that the method is almost as quick as and far more delicate than mere visual observation.

Routine analysis is frequently confined to a narrow range of *p*H values, in which case a very high degree of accuracy can be obtained by the use of an indicator specially suited to the required range in conjunction with a calibration curve for the indicator selected.

The examples given will, it is hoped, be sufficient to indicate the very wide application of this simple instrument to routine laboratory practice where a large number of similar tests have to be made.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in FOOD MANUFACTURE should not be taken as an indication that they are necessarily available for export.

Sending Food by Rail in Wartime

GRAHAM SAVILLE

WAR CONDITIONS have made it necessary for many alterations to be introduced in railway transport arrangements, and all engaged in the food industry should have a clear understanding of these to ensure efficient working.

Labelling Amendment

An important labelling amendment concerns traffic when forwarded in less than truck loads. The following regulations must be carried out when the consignment consists of a number of individual packages. If there are one to ten packages in the consignment, all must be fully labelled; when eleven to a hundred packages, one in every five, with a minimum of ten; and should the consignment consist of over a hundred packages, one in every ten must be labelled, with a minimum of twenty. In addition, all the packages not fully labelled must be marked with the consignee's name and destination town—*e.g.*, Martin, Manchester; or Brown, Birmingham.

Labels should also be white and clearly typed or written in ink. It is normally advisable that the sender's name and address should be shown on the labels; this principle should not, however, be followed with foodstuffs, which are particularly liable to pilferage and the nature of which would be indicated by the sender's name.

It has been agreed by the Ministries of War Transport and Supply that in spite of paper shortage it is imperative to continue the use of labels on goods sent by rail.

A further regulation makes it necessary to indicate on the consignment note and labels the letter and number of the postal district (or, where the postal district is indicated by a number alone, the number of the postal district) when the consignee's premises are situated in certain areas. The areas concerned are:

1. Birmingham.
2. Brighton.
3. Bristol.
4. Edinburgh.
5. Gateshead.
6. Glasgow.
7. Hove.
8. Leeds.
9. Liverpool.
10. London.
11. Manchester.
12. Newcastle-upon-Tyne.
13. Salford.
14. Sheffield.

Nominated Loading

Another wartime development is "nominated loading". This arrangement imposes certain restrictions on the forwarding of traffic to various stations. Traffic is only accepted by specified stations on set days; for example, station "A" may forward to "W" and "X" on Tuesdays and Thursdays and to stations "Y" and "Z" on Wednesdays and Fridays. As the railway companies will not accept traffic tendered on wrong days, the trader should watch carefully any developments affecting his own area.

Foodstuffs, in addition to having to comply with the railway companies' own despatching regulations, also come within the restrictions of numerous Ministry of Food arrangements, of which one of the most important is the Sector Distribution Scheme.

The operational arrangements of the scheme are widely known, but the special significance from the rail transport angle is that, broadly speaking, goods can only be despatched to retailers from points within the same sector. Arrangements have therefore to be made for warehouse accommodation to be made available in each sector in which retailers are supplied. The commodities can then be despatched in bulk to the sector warehouse and thence distributed to the retailer. Sector warehouses have to be approved by the Ministry of Food.

Complaints and Claims

Another matter closely allied with rail transport arrangements which must be borne in mind is the making of complaints and claims. The railway companies allow certain relaxations of the time limits laid down by the Statutory Conditions, and consider complaints and claims when notified within rather longer periods. In cases of partial loss consisting of damage, pilferage, deviation, misdelivery, delay or detention, whereas the previous period in which the written complaint had to be made was three days, this is now six, and a claim must be made within ten days instead of seven days. With the loss of a whole consignment or of a whole package or packages forming part of a consignment, the previous times for complaint and claim of fourteen and twenty-eight days have been extended to twenty-eight and forty-two days respectively. Complaints and claims must be in writing, and still have to be sent to either the forwarding or delivering station or to the head office of either forwarding or receiving company.

A special wartime arrangement of particular interest to food concerns handling large numbers of claims is a scheme introduced by the railway companies, under which they pay certain fixed sums in consideration of the trader not lodging claims.

Under such an arrangement a considerable economy in clerical labour is effected. The agreements are fairly elastic and can usually be made to suit the individual trader's needs. All claims, or only those of a certain kind—*e.g.*, under £20 on forwarded traffic—can be included, and the fixed payment is generally in the form of a percentage of a firm's carriage account.

Types of Risk

In the forwarding of foodstuffs a very important factor is the "risk" at which they are consigned. There are three types of risk which normally cover such traffic; these are (1) company's risk, (2) owner's risk, (3) damageable goods not properly protected by packing.

Under company's risk conditions the railway company is responsible for the safety of the goods except in certain limited circumstances as follows:

(*a*) Act of God.
(*b*) Act of war or the King's enemies.

(*c*) Arrest or restraint of princes, or rulers, or seizure under legal process.
(*d*) Orders or restrictions imposed by the Government or any department thereof.
(*e*) Act or omission of the trader, his servant or agent.
(*f*) Inherent liability to wastage in bulk or weight, latent defect or inherent defect, vice or natural deterioration of the merchandise.
(*g*) Casualty (including fire or explosion).

But even in these circumstances the railway company must show that all reasonable care and foresight was used by them in the carriage of the goods.

Choice of Risks

The trader with certain traffics has the choice of consigning at company's risk or owner's risk; an example of such traffic is fruit essences, for flavouring food, confectionery and beverages, in carboys. Traffics which may be carried under owner's risk conditions are indicated by the insertion of a small letter, " a " to " h ", against the classification of the merchandise in the Railway Clearing House's " General Classification of Goods ".

Under such arrangements the trader obtains a concession in charges, but has to accept the bulk of responsibility for damage, the railway company being liable only when such has been caused by their wilful misconduct. The onus to deliver the goods lies with the railway company, even with owner's risk traffic, unless they prove that loss or pilferage is not due to their negligence.

The third set of conditions, that of " damageable goods not properly protected by packing ", is applicable to traffic which the railway companies are not willing to accept under ordinary company's risk conditions unless they are packed in accordance with certain conditions. An example is dried milk in tins, which, when not packed in cases or crates, is only accepted as " damageable goods ". With goods forwarded under such conditions the trader has a right to expect the goods to be delivered, but a claim for damage will not succeed unless it can be shown that the damage would have occurred had the goods been properly packed and in circumstances which would have made the railway company liable under ordinary company's risk conditions.

Use of Fibreboard Cartons

When fibreboard cartons are used for the outer packing, traffics are only accepted as " damageable goods ", unless the cartons comply with the railway companies' requirements and bear certificates on the following lines :

> CERTIFICATE
>
> *This case complies with the requirements of the General Classification of Merchandise.*
>
> *The capacity of this case is.....lbs.*

It should be remembered that in the event of fraud on the part of the trader the railway company is relieved of all liability.

With the necessity of using inexperienced staff during wartime, particular attention must be paid to the compilation of consignment notes.

The sender must be careful to show the following particulars :

1. Full names and addresses of sender and consignee.
2. The station or place of destination.
3. Such particulars as are necessary to enable the railway company to calculate the charges payable (nature of the goods, gross weight and number of packages).
4. Whether the consignment is " To wait order " at a particular station.

In order that the trader may obtain the benefit of the lowest charges, he should be careful to give an accurate description of the traffic being forwarded, and it is also advisable to endorse the consignment note " Part lot where applicable ".

Credit Facilities

Under the new arrangements which operated from January 1, 1943, all traffic, except fresh fruit and fresh vegetables, cattle, sheep and pigs, when forwarded by railway goods service, must be sent " carriage paid ". While the consignor will be responsible for paying the carriage charges at the forwarding station, it will not necessarily involve prepayment. To avoid having to deal with a miscellaneous assortment of railway accounts, food concerns will find it advisable to arrange credit facilities with the railway companies if they have not already got such arrangements in operation.

Finally, the sender should also show on the consignment note whether he wishes the traffic to travel at company's risk or owner's risk conditions; the latter will of course only apply when the appropriate rates are in operation.

Rye Flour in National Bread

(*Continued from page* 145)

REFERENCES

[1] W. P. Ford : *Proceedings of the Food Group. The Society of Chemical Industry*, 1941, iv, 129.
[2] W. T. Banfield : *Manna*, 7.
[3] E. B. Bennion : *Breadmaking*, 1939, 19.
[4] C. H. Bailey : *The Chemistry of Wheat Flour*, 1925, 102.
[5] E. B. Bennion : *Breadmaking*, 1939, 68.
[6] A. R. Daniel : *Confectionery and Baking Craft*, 1942, **28**, 153.
[7] " Astolat " : *Confectioner Baker*, 1942, **71**, 15.
[8] A. Schulerud : *Mühlenlab.*, 1937, **7**, 105-110.
[9] C. W. Brabender, G. Mueller, A. Koster : *Z. ges. Getreidew.*, 1937, **24**, 168-175.
[10] H. Scholz : *Z. ges. Getreidew.*, 1939, **26**, 151-154.
[11] Kent Jones : *Modern Cereal Chemistry*, 1939.
[12] J. R. Seville : *Food Manufacture*, 1942, **17**, 68.

"Other Fleas . . ."

NOT HAVING previously had anything to do with matters entomological and to have written a book* on them which, judging from the present reviewer's reactions, appeals to a non-entomological mind, may be counted as something of an achievement.

Dr. Nicol has a way of writing that, however academic his theme, cheerfulness and humour *will* break through and the preliminary fillip he gives to the mind of the reader by skilfully selected quotations from *Alice in Wonderland* and *Through the Looking-Glass* under the chapter headings is good psychology.

One of the author's *obiter dicta* is "science can be enormously human". He has previously demonstrated his capacity for effecting the humanising process in his book *Microbes by the Million*. He has done it again in the course of explaining to the layman the remarkable achievements of entomologists in the direction of eliminating insect and plant pests by insects.

Combating Citrus Fruit Pests

Many classic examples of the obliteration of pests are given in full. The cottony-cushion or fluted scale insect took on, in 1872, the proportions of a pest and bade fair to threaten the Californian orange and lemon industry. A ladybird beetle (*Vedalia cardinalis*) from Australia was introduced into the groves; only 129 of the first consignment survived the journey, but these few reproduced so rapidly that millions were on hand in a relatively short time. This ladybird has undoubtedly saved the citrus growers of California millions of dollars each year and the cost of importing it was only $1,500. Into every country affected by the cottony-cushion scale Vedalia has been introduced and has repeated the success first achieved in California.

Another example is the control in Fiji of the coconut scale insect, *Aspidiotus destructor*, by means of a ladybird beetle imported from Trinidad.

The Search for Parasites

The story of the search for parasites is a fascinating one. Some idea of the patience and tenacity of the men engaged in the work may be gathered from the following reference to J. G. Myers' paper, "The discovery and introduction of the Amazon fly", *Tropical Agriculture*, vol. xi., 1934:

> For the purpose of transporting the live Amazon flies collected by J. G. Myers in the vicinity of Santarem, on the Amazon half-way up to Manaos, to Pará, from which they were sent by air to Georgetown, British Guiana, a launch was bought in Glasgow and was shipped to Georgetown. The adventures of this launch are only hinted at by Myers, but they would evidently form a fascinating story. The launch was only 26 feet long, but was of a type likely to withstand the heavy seas on approaching Pará. After arrival at Georgetown the launch sailed up the Essequibo, and was overturned and wrecked in the rapids at Gold Fall; was salvaged; taken across the watershed; put into commission on the Rio Mahu; then sailed to Santarem *via* the Rio Branco, Rio Negro, and Manaos. This was in 1933.

The difficulties encompassing the lot of the entomologist are legion. For instance, there is the example of the evolution of a race or strain of codling moth which differed from the usual kind by developing some resistance towards insecticidal poisons, thereby creating the necessity for planning their destruction biologically.

Besides insects, fish, giant toads and trap crops may be used in the war against the enemies of food and industrial plants. A trap crop is a crop attractive to animals, of little economic value, which the grower of the principal crop is prepared to grow and if necessary to sacrifice, in order that infestation of the principal crop can be checked or reduced.

Rearing Insects

A building in which insects are bred is called an insectary. It does not have to be an elaborate structure. The essential parts of it are a roof and some shelves and a bench or two and mesh for the walls. Special techniques for multiplying insects have to be devised and applied. An unusual method used by T. H. C. Taylor on the island of Levuka in Fiji is particularly ingenious, but its description is too long to be quoted here.

Nature v. Man

The natural balance between pest and its surroundings depends upon a large number of factors, not all of which are understood. The example of the cottony-cushion scale successfully controlled by the ladybird in California led to high hopes, which may be summarised by saying that it was thought that one had only to find the appropriate insect and every pest could be controlled. That for the cottony-cushion scale in California another insect was found to solve the problem was, it must be said, just a piece of luck. In saying this, no reflection is intended upon the entomologists who sought for and found the ladybird; for it happened that the environmental conditions in California were right for this ladybird, and that no complicating factors came in. So in this instance (and in some others) the struggle became an apparently straight fight between only two contestants. But the matter is not always as simple as that, as is amply demonstrated in the text.

The biological control of insects has affected citrus fruits, bananas, maize, coffee and a host of other products. The food manufacturer and consumer do not have to worry about the insect pests described (although the manufacturer has his own troubles from other insect pests), but would not be the worse for knowing about some of the efforts expended in growing the food. If they wish to go farther afield there is a good bibliography to help them. Dr. Nicol's book can be recommended not only to those mentioned but also to the general reader.

T. C.-W.

* *The Biological Control of Insects.* By Hugh Nicol. A Pelican Book. Pp. 175. 9d. net.

Society of Dairy Technology

A Society of Dairy Technology was formed at a well-attended meeting held at the London School of Hygiene on March 2, 1943. Professor H. D. Kay, Director of the National Institute for Research in Dairying, presided over a gathering which was representative of all aspects of the dairy industry in Great Britain. The meeting discussed a memorandum prepared by a committee appointed at an informal meeting held in London in November, 1942.

The objects of the Society of Dairy Technology are to improve and co-ordinate practice in all branches of the dairy industry by the application of knowledge gained from experience and experiment; to provide opportunities for discussion and collaboration between persons interested in improving the technical practices of the dairy industry; to encourage technical education for persons working with milk and its products; to encourage scientific enquiry into problems arising in the dairy industry; and to encourage the distribution and use of technical information among persons working in the dairy industry. The society will not engage in political activities nor will it infringe on the duties or responsibilities of existing organisations. It will fill a need for some organisation in which all persons concerned with this great primary industry can meet on common ground. This need has recently been accentuated by the emphasis placed on the vital importance of milk and dairy products and the extraordinary difficulties confronting those engaged in producing and handling these foods. Those who attended the meeting, and many who were unable to attend, expressed the view that a Society of Dairy Technology could do a great deal to promote scientific and technical collaboration and improvement, and so ensure the efficient production and handling of the country's most valuable protective foods.

A Provisional Council was elected as follows: Mr. R. Arnison, Professor E. Capstick, Dr. H. B. Cronshaw, Mr. E. L. Crossley, Dr. J. G. Davis, Mr. Graham Enock, Mr. H. C. Horne, Professor H. D. Kay, Mr. A. McBride, Mr. J. Matthews, Mr. F. Proctor, Professor D. M. Smillie, Mr. E. A. Shepheard (hon. treasurer), Mr. H. C. Hillman (hon. assistant treasurer), and Mr. A. L. Barton and Mr. W. G. Sutton (hon. secretaries).

It is intended to hold meetings in convenient centres, and the first will be held in the near future. Meetings will provide opportunities for full discussion of urgent problems.

Membership in the Society is open to all who are interested in the scientific and technical aspects of the dairy industry, including production, processing, manufacture, equipment, distribution, education, research, public health, and consumption.

Food Research in the U.S.S.R.

A method for the laboratory control of the composition of meat mince (cutlets). V. R. Chertok and N. V. Beresovskaya. (*Problems of Nutrition*, 1941, *Vol. 2.*)

THE authors propose a method for the direct determination of the carbohydrate content in meat mince with the help of a rapid acid hydrolysis of starch. Calculations are carried out according to the formula—

$$X = \frac{a \times 36}{39{\cdot}7}$$

where X represents the percentage of bread in the meat mince and a the quantity of glucose determined in 25 c.c. filtrate after starch hydrolysis.

The determination according to the above-indicated method of the bread content in mince meat, and knowledge of the quantities of dry matter contained in the food, allow the total composition in weight of the product to be calculated. The following formula can be used:

$$Y = d - \frac{X \times 54 \times 3}{25 \times 98}$$

where Y represents the percentage meat, X the percentage bread, and d the percentage dry matter in the meat mince.

The weight of water contained in the product can be estimated by using the formula—

$$Z = 100 - (X + Y),$$

where Z represents the percentage water, X the percentage bread, and Y the percentage meat of the product.

The proposed method can be adapted to the determination of meat mince containing other carbohydrates, such as, for instance, boiled millet or potatoes, etc.

The hemolytic index and the Nessler value as indexes for the valuation of the quality of meat. S. S. Paikin and M. P. Podossinnikova. (*Problems of Nutrition*, 1941, *Vol. 2.*)

Determinations of the hemolytic index were carried out on 22 series of experiments, in which beef meat was used as experimental material. Of 13 decaying samples, weighing about 1 to 1½ kg. each and kept in the laboratory at 13° to 23° C. for various times, 7 had a hemolytic index of 10 or more.

The hemolytic index of suspected meat and meat which was beginning to decompose fluctuated between 5 and 8, while 5 seemed to be the normal index for fresh meat kept for 1 to 2 days.

The authors obtained a continuous curve illustrating the increase of the hemolytic index during progressive decomposition; it was, however, not possible to obtain accurate values for the initial stages of decay. The cumbersome operations involved in the determination of the hemolytic index, such as the long time required for the preparation of the various experimental samples, the impossibility of obtaining any results before 24 hours, and especially the absence of concurrent data for the initial stages of decomposition, make this method unsuitable for practical use.

The authors are of the opinion that the method of employing the Nessler value determination is one of the best from the practical point of view. From investigations into the causes of considerable differences in the Nessler values of meat at similar terms of storage and degree of decomposition the authors conclude the following: That strictly standardised solutions and conditions be used for all determinations, and that completely ammonia-free distilled water be employed for the preparation of extracts and Nessler reagents. The following picture was definitely established: N. numbers above 5 indicate suspect meat, numbers between 6·25 and 7·5 point to the beginning of decay, 10 and higher numbers are signs of definite and advanced decomposition.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, March 1, page 93.

No.	*Date.* 1942.	PRICE FIXATION ORDERS
2274	Nov. 4.	Order, Prescribing an Appointed Day for the Purposes of the Game Birds (Maximum Prices) Order, 1942.
2307	,, 9.	Directions, supplementary to the Potatoes (1942 Crop) (Control and Prices) (No. 2) Order, 1942.
2310	,, 10.	Amending the Egg Products (Control and Maximum Prices) Order, 1942.
2328	,, 11.	Amending the Imported Canned Meat (Maximum Prices) Order, 1942.
2330	,, 11.	Amending the Butter (Maximum Prices) (No. 2) Order, 1940.
2341	,, 13.	Amending the Biscuits (Maximum Retail Prices) Order, 1942.
2350	,, 14.	Mustard Seed (Control and Maximum Prices) Order, 1942.
2358	,, 17.	Amending the Barley (Control and Maximum Prices) (Northern Ireland) Order, 1942.
2359	,, 17.	Amending the Barley (Control and Maximum Prices) (Great Britain) Order, 1942.
2363	,, 17.	Amending the Eggs (Control and Prices) (Great Britain) Order, 1942.
2426	,, 26.	Amending the Threshed Feeding Peas (Control and Maximum Prices) (Great Britain) Order, 1942.
2428	,, 26.	(Maximum Prices) (No. 3) Order, 1942. Revokes S.R. and O. 1942 No. 1015 (Kitchen Waste).
2455	Dec. 1.	Saccharin (Control and Maximum Prices) Order. Revokes S.R. & O. 1941 No. 2129 and 1942 Nos. 174, 348 and 1106.
2456	,, 1.	Directions, supplementary to the Barley (Control and Maximum Prices) (Great Britain) Order, 1942.
2460	,, 2.	Meat (Maximum Retail Prices) Order. Revokes S.R. & O. 1940 Nos. 37 and 326, 1941 Nos. 12, 746 and 1205, and 1942 No. 1212.
2461	,, 2.	Threshed Home-Grown Peas (Control and Prices) (No. 2) Order.
2482	,, 4.	Jam and Marmalade (Maximum Prices) Order. Revokes S.R. & O. 1941 Nos. 1735 and 1736, and 1942 Nos. 545 and 714.
2515	,, 9.	Amending the Imported Canned Fish (Maximum Prices) Order, 1941.
2517	,, 9.	Directions, supplementary to the Potatoes (1942 Crop) (Control and Prices) (No. 2) Order, 1942.
2525	,, 11.	Amending the Green Onions (Maximum Prices) Order, 1942, and the Green Onions (Maximum Prices) (Northern Ireland) Order, 1942.
2541	Dec. 12.	Amending the Directions, December 1, 1942, supplementary to the Barley (Control and Maximum Prices) (Great Britain) Order, 1942.
2549	,, 15.	Amending the Feeding Stuffs (Maximum Prices) Order, 1942.
2550	,, 15.	General Licence, under the Flour (Maximum Retail Prices) Order, 1942.
2571	,, 16.	Amending the Rice (Maximum Prices) Order, 1942.
2611	,, 21.	Rhubarb (Maximum Prices) Order.
2622	,, 22.	Fish Cakes (Maximum Prices) Order.
2662	,, 30.	Amending the Home-Grown Tomatoes (Maximum Prices) Order, 1942.
2664	,, 30.	Green Vegetables (Maximum Prices) Order.
2674	,, 31.	Salmon (Maximum Prices) (No. 2) Order.
	1943.	
14	Jan. 2.	Amending the Directions, December 1, 1942, supplementary to the Barley (Control and Maximum Prices) (Great Britain) Order, 1942.
37	,, 8.	Amending the Pickles and Sauces (Control and Maximum Prices) Order, 1942.
42	,, 13.	Bread (Control and Maximum Prices) Order. Revokes S.R. & O. 1940 Nos. 865 and 1457; 1941 Nos. 980, 1542, 1554 and 1603; 1942 Nos. 340, 453, 899, 1399, 1916 and 2240.
44	,, 9.	Amending the Potatoes (1942 Crop) (Control and Prices) (No. 2) Order, 1942, and giving Directions supplementary thereto.
45	,, 9.	Amending the Oranges (Maximum Prices) Order, 1942.
51	,, 11.	Amending the Tea (Current Prices) Order, 1941.
88	,, 19.	Amending the Bread (Control and Maximum Prices) Order, 1943.
101	,, 22.	Swedes (Maximum Prices) Order.
111	,, 23.	Amending the Pepper (Control and Maximum Prices) Order, 1941.
131	,, 27.	Amending the Soft Drinks (Current Prices) Order, 1942.
143	,, 29.	Flavouring Essences (Current Prices) Order.
144	,, 29.	Fruit (Canning, Bottling and Freezing) (Control and Maximum Prices) Order.
		CONFECTIONERY
	1943.	
12	Jan. 2.	Amending the Cake and Flour Confectionery (Control and Maximum Prices) Order, 1942.

No.	Date.	
	1942.	**FEEDING STUFFS**
2495	Dec. 4.	Fertilisers and Feeding Stuffs Regulations Amendment Order. (Reg. 60CA.)
2521	,, 10.	Amending the Feeding Stuffs (Regulation of Manufacture) Order, 1942.
	1943.	
11	Jan. 4.	Flour Order. Revokes S.R. & O. 1940 No. 641; 1941 Nos. 467, 656, 1069, 1070, 1239, 1291, 1478 and 1529; 1942 Nos. 348, 451, 452, 876, 1123, 1297, 1493, 1697, 1792, 1899, 1917, 1932 and 2120.
28	,, 6.	General Licence, under the Feeding Stuffs Distribution (Licensing and Control) Order, 1942, and the Feeding Stuffs (Control) (Northern Ireland) Order, 1941.
56	,, 12.	General Licence, under the Feeding Stuffs (Regulation of Manufacture) Order, 1942.
78	,, 15.	Directions, supplementary to the Feeding Stuffs (Rationing) Order, 1942. Revokes S.R. & O. 1942 Nos. 822, 1756 and 2253.
148	,, 30.	General Licence, under the Feeding Stuffs (Rationing) Order, 1942, the Feeding Stuffs Distribution (Licensing and Control) Order, 1942, the Oats (Control and Prices) (Great Britain) Order, 1942, the Barley (Control and Maximum Prices) (Great Britain) Order, 1942, the Home-Grown Beans (Control and Maximum Prices) (Great Britain) Order, 1942, the Home-Grown Rye (Control and Maximum Prices) (Great Britain) Order, 1942, the Threshed Feeding Peas (Control and Maximum Prices (Great Britain) Order, 1942, the Home-Grown Dredge Corn (Control and Maximum Prices) (Great Britain) Order, 1942, and the Home-Grown Wheat (Control and Prices) (Great Britain) Order, 1942.
		FISH
	1942.	
2538	Dec. 9.	Fish (Supplies to Catering Establishments) Order.
	1943.	
67	Jan. 13.	Amending the Fish (Supplies to Catering Establishments) Order, 1942.
81	,, 16.	Amending the Fish (Licensing of Dealers and Processors) Order, 1942.
110	,, 23.	Salmon (Distribution) Order.
		GENERAL
	1942.	
2466	Dec. 2.	Prescribing an Appointed Day for the purposes of the Flour (Registration) Order, 1942.
2531	Dec. 11.	(Consolidation and Extension) Order, Revokes S.R. & O. 1941 Nos. 1258, 1400 and 1685, and 1942 No. 856.
2539	,, 11.	Milk Marketing Board (Modification of Functions) Order.
2540	,, 12.	Amending the Directions, September 15, 1942.
2613	,, 21.	Amending the Food (Restriction on Dealings) Order, 1941. (Meat Products and Cooked Meat.)
2635	,, 23.	Ships' Stores (Control) Order. Revokes S.R. & O. 1939 No. 1857 and 1942 No. 212.
2663	,, 30.	General Licence.
		MANUFACTURED AND PRE-PACKED FOODS
2476	Dec. 2.	Order, fixing Appointed Days under the Manufactured and Pre-Packed Foods (Control) Order, 1942.
		RATIONING
2516	Dec. 9.	Directions, supplementary to the Food Rationing Orders, 1942.
2634	,, 23.	Order, amending the Rationing (General Provisions) Order, 1942.
	1943.	
46	Jan. 9.	Order, amending the Cheese (Rationing) Order, 1942.
109	,, 23.	Order, amending the Meat (Rationing) Order, 1942, the Sugar (Rationing) Order, 1942, and the Food (Points Rationing) (No. 2) Order, 1942.
		RATIONING (POINTS)
	1942.	
2526	Dec. 11.	Amending the Food (Points Rationing) (No. 2) Order, 1942.
2528	,, 11.	Amending the Rationing (Personal Points) Order, 1942.
	1943.	
6	Jan 1.	Amending the Rationing (Personal Points) Order, 1942
47	,, 9.	Amending the Food (Points Rationing) (No. 2) Order, 1942.
		TRANSPORT
	1942.	
2518	Dec. 9.	Amending the Directions, April 4, 1942.
2520	,, 10.	Amending the Directions, October 3, 1942.
	1943.	
38	Jan. 7.	(Prepacked Butter) Directions.
39	,, 7.	Directions (Carrots).
121	,, 25.	(Green Vegetables) Directions.
		VEGETABLES
5	Jan. 8.	Fresh Fruit and Vegetables (Restrictions on Dealing).
		WINE AND SPIRITS
80	Jan. 15.	Amending the Wine and Spirits (Prohibition of Auction Sales) Order, 1942.

News from the Industry

CHANGES OF ADDRESS

Fish Division

The address of the Fish Division of the Ministry of Food is now Carlton Hotel, Pall Mall, London, S.W. 1, instead of Portman Court, Portman Square, W. 1. The telephone number is Whitehall 7311 and the telegraphic address "Fishkeepa, Piccy, London".

Correspondence on all matters relating to the distribution and sale of fish (other than canned fish) should be addressed to the Director of Fish Supplies at the new address.

* * *

Fresh Fruit and Vegetables Division

The address of the Fresh Fruit and Vegetables Division (including the Finance Division and the Licensing Section) is now the Carlton Hotel, Pall Mall, London, S.W. 1, instead of 9-10, Savile Row, W. 1. The telephone number is Whitehall 7311.

Applications for licences should in future be addressed to the Licensing Section of the Division at the Carlton Hotel, and not to St. John's College, Oxford.

* * *

Australian Dried Meat for Britain

Mr. J. Scully, Australian Minister of Commerce and Agriculture, announces that the Australian dehydration of meat programme is advancing rapidly and that it is hoped to send 5,000 tons of dried mutton to Britain within the next twelve months. He also predicted a large oversea demand for Australian dried meat after the war. He said it was expected that the Australian dehydrating industry would expand greatly. Eastern markets especially were expected to take much more of this meat because of its cheapness.

Dehydrated meat would be "the commodity of the future", he said. Twenty Australian dehydration works costing about £200,000 will be operating by the end of June.—*Reuter.*

NEW APPOINTMENTS

Cake and Flour Confectionery

The Ministry of Food announces that Mr. G. S. Noon, formerly Deputy Director for Biscuits, has been appointed Director for Cake and Flour Confectionery, with Mr. O. Massey as Deputy Director.

* * *

Manufactured Foods

The Minister of Food has appointed Mr. F. Monkhouse to be Director of the Miscellaneous Food Products Branch in the Manufactured Foods Division of the Ministry. Mr. Monkhouse is Chairman and Managing Director of Monkhouse and Glasscock, Limited, Glasgow, the well-known firm of food manufacturers. He has a lifelong experience of the trade and has been a member of a number of advisory committees set up by the Ministry of Food.

* * *

Equipment and Stores

The Minister of Supply has appointed Mr. Ralph Wilkins to be Director of Supplies (Special) in the Department of the Director-General of Equipment and Stores. This Directorate will be responsible for the production and reconditioning of kegs, drums and steel barrels. Mr. Harold N. Butler, formerly Deputy Controller of Molasses, has been appointed Deputy Director of Supplies (Special).

* * *

Rations for Transport Horses

The summer rationing period for feeding stuffs for horses begins on May 1.

Rations will only be issued for horses engaged on work of national importance. They will not be allowed during the summer for horses used for riding or driving except by a doctor or veterinary surgeon for the purposes of his practice or where they provide an essential means of transport for other professional or business purposes. Hay and straw are not rationed.

Zoning of Chocolates and Sweets

A zoning scheme for chocolates and sweets will be introduced as soon as possible and it is expected that the date of operation will be June 27.

Under the scheme the country will be divided into four zones, the whole of Scotland forming the Scottish zone; the Northern, North Eastern, North Midland and Eastern Food Divisions forming the Eastern zone; the London, Eastern II, South Eastern, Southern, South Western and South Wales Food Divisions forming the Southern zone; and the Midland, North Wales, North Western and Northern Ireland Food Divisions forming the Western zone.

In general retailers and wholesalers in a particular zone will not be able to receive supplies manufactured outside that zone, although arrangements will be made to deal with bulk transfers from one zone to another if there are surpluses or deficiences in production.

The Cocoa and Chocolate (Wartime) Association and the Sugar Confectionery (Wartime) Association, through whom the scheme is being operated, are arranging for the largest manufacturers to exchange their accounts so that a retailer or a wholesaler in a particular zone now receiving supplies from one or more of the manufacturers situated outside that zone will after zoning receive supplies from one or more of the manufacturers situated near at hand within the zone.

* * *

Cocoa Butter

The recent reduction in chocolate production has resulted in a surplus of cocoa butter. The confectionery industry has been able to use this surplus in the manufacture of sweets, and so free oils and fats for other important uses.

This chiefly affects toffee, and it results in a toffee which is better to eat and keeps better. The ingredients, however, cost more, and some sweets, chiefly toffee, will be increased in price in the near future by ½d. or 1d. per ¼ lb.

Return of Flour Bags

Owing to war conditions in India and to the need for saving shipping space, supplies of jute are necessarily restricted. As a consequence, the supply of new returnable flour bags is substantially reduced.

In these circumstances, it is more than ever necessary that bakers and other flour users should return these flour bags to their millers with the least possible delay.

Unfortunately, this is not being done and it is also being found that a considerable number of the bags which are returned are so dirty that they are unfit for refilling.

The attention of those concerned is, therefore, called to the Flour Order, 1943 (S.R. & O. No. 11). Article 23 of this Statutory Order makes it an offence for any person to—

(*a*) Use any returnable bag except for the transport or display for sale of such cereal product as was delivered to him in such bag; (*b*) Keep any returnable bag for an unreasonable period; (*c*) Obliterate, deface or alter any mark or name on any returnable bag; (*d*) Fail to return the bag forthwith after receiving a request in writing from the owner for its return, except upon reasonable cause shown; (*e*) Fail to exercise all reasonable care in the use and storage of the bag so that it may, so far as is practicable, be returned in the same condition as when it was received.

Infringements of this Order are offences against the Defence (General) Regulations, 1939.

* * *

Meat Rationing in Canada

Meat rationing will be introduced in Canada early in May. Mr. Ilsley, the Finance Minister, said that the necessity for rationing arose from two causes, the need of more equitable distribution in the Dominion, and that of maintaining an adequate flow of supplies oversea. The new regulations will assist in maintaining British rations.

The ration in Canada will be approximately 2 lbs. a week, and it is proposed to establish meatless days in hotels and restaurants. The regulations will not affect fish or poultry.

Concentration of Industry

Concentration of industry schemes have now released for war purposes a total of 137,000,000 sq. ft. of factory space and 250,000 workers.

* * *

The Phosphatase Test for Milk

Issued by the Ministry of Health as an addendum to their Memo. 139/Foods, is a Memo. on laboratory technique in the phosphatase test for heat-treated milk.

The Memo. gives full particulars regarding the reagents and their preparation; the determination; precautions to be observed; and the interpretation of results.

* * *

Certification of Growing Crops of Potatoes, 1943

The Ministry of Agriculture and Fisheries has again made arrangements for the inspection, with a view to certification, of growing crops of potatoes from which growers intend to save seed for planting or for sale for planting in the following year.

The Ministry is prepared to accept applications in respect of crops being grown from Class 1 (Scotch) seed with a S.S., T.S., or N.I. health certificate, Class 1 (Irish), Class 1 (English Special Stock) or Class 1 (Welsh Special Stock) seed, or a stock known to the Ministry to be of an equivalent standard; provided they are growing at least 10 yards from any crop of potatoes grown from other parent stocks.

An explanatory memorandum giving full particulars and incorporating a form of application is being addressed to all growers who entered stocks for inspection in 1940, 1941 and 1942. Other growers desiring their growing crops to be examined should write (preferably on a post-card) for the memorandum and application form to the Secretary, Ministry of Agriculture and Fisheries, Lindum Hotel, St. Annes, Lytham St. Annes, Lancs.

A separate application form must be completed in respect of each separate farm. Except in special circumstances applications will not be accepted for less than one acre of any one variety. June 16, 1943, is the latest date for the acceptance of applications.

British Exports

International agreements among manufacturers and producers to regulate prices, particularly of food and raw materials, and the distribution of manufactured products, were advocated by Mr. Leslie Gamage, the new president of the Institute of Exports, in London, recently.

Without greatly increased exports, all our hopes of social security after the war—health, housing and education—were merely idle dreams, he said.

An agreement was also necessary for the whole field of air transport.

Such understandings as he contemplated must entail some degree of Government control to see that the interests of consumers were fully protected.

* * *

The Raw Materials Guide

Hitherto an elaborate filling system has been necessary to enable buyers to keep up to date information on the Orders Regulations and Licensing requirements of raw materials. For materials regulated by the Ministry of Supply alone there are 29 separate controls or licensing authorities, and no week passes without changes in the methods of distribution, prices or trading conditions.

The Raw Materials Guide, recently issued by the Ministry of Supply (price 1s.), is an exceedingly useful handbook. For each of the 29 groups of materials, corresponding to the controls, it gives: (1) An idea of the nature and countries of origin; (2) the procedure for obtaining supplies; (3) the form of control exercised over dealings in the commodities in the group; (4) a summary of the Statutory Rules and Orders restricting their use, in chronological order, to provide a history of the commodity's regulation from the start of the control; and (5) the name and address of the control concerned. There is also an adequate index of specific raw material. The situation in December, 1942, is surveyed in this first edition of the handbook. Addenda to be issued from time to time will be paginated consecutively, and spaces have been left for insertion of the folio numbers of any cross references needed by the individual user of the guide.

Licensing of Industrial Canteens

The Minister of Food attaches great importance to the standard of meals provided in industrial canteens. Satisfactory feeding facilities play a great part in maintaining the morale of workers in war industries and in enabling production to be kept at the level needed for the efficient prosecution of the war. The Minister intends to take all necessary steps to ensure that industrial canteens make proper use of the equipment and food supplies at their disposal for the service of adequate, nutritious and properly cooked meals.

After discussion with the Minister of Labour and National Service, the Minister of Food has decided to amend the procedure for the licensing of canteens operated by, or on behalf of, industrial undertakings. In future, licences granted for all catering establishments in this category will be issued by the Ministry of Food Headquarters, and not as hitherto from local Food Offices.

* * *

Limitation of Supplies (Miscellaneous)—Returns

The Board of Trade have issued a Direction (S.R. & O., 1943, No. 501) under the Limitation of Supplies (Miscellaneous) (No. 16) Order, 1942, requiring every person whose name was at January 31, 1943, entered in the Home Trade Register to complete a form of return, Misc. 15, showing *inter alia* the value of controlled goods supplied by him during the standard period June 1, 1939, to May 31, 1940, and during the restriction period August 1, 1942, to January 31, 1943. Persons whose quota was less than £100 a month and who have given notice in writing to the Board under Article 3(6B) of the Order need not complete this return, but will be directed individually to complete a separate form of return, Misc. 16.

A copy of the appropriate form of return is being sent to each person concerned, but any trader who has not received his copy by May 8, 1943, should make application for one to the Assistant Chief Accountant, Miscellaneous Section, Industries and Manufactures Department 3, Board of Trade, Prince Albert Road, N.W. 8.

United Nations Co-operating on the Food Front

Close co-ordination of the food production resources of the United Kingdom, British Dominions and United States was reported recently by the U.S. Department of Agriculture. In "Foreign Agriculture", a publication prepared by the Office of Foreign Agricultural Relations, the department gives the following facts about the Empire's contributions on the food front:

Canada last year sent three times as much bacon and 60 per cent. more cheese to Great Britain than in 1938. Despite serious labour shortages, Canada is increasing the production of pork, cheese, vegetables, flax fibre and seed, soya beans, sugar beet seeds and honey. Australia, while feeding its own people and Allied armed forces in the South-west Pacific, is supplying meat, butter, cheese, eggs, sugar, canned and dried fruits and vegetables to the United Kingdom. New Zealand, with one of the most acute man-power problems of any of the United Nations, is making similar contributions and there has been no perceptible decline in food production. The Union of South Africa had heavy demands upon her food supply to care for war prisoners, supply enormous convoys and feed large numbers of Europeans vacated from other parts of Africa.—*Reuter.*

* * *

Proposed Amalgamation

A special meeting of the Scottish Co-operative Wholesale Society is being held to ask members to approve an interim report on negotiations to date between the S.C.W.S. and the C.W.S. and to authorise further developments. Negotiations have been proceeding between the directors of these two Co-operative controlling bodies with a view to amalgamating or co-ordinating the interests of both undertakings.

The two bodies control £150 million capital and an annual trade of £175 million and would form the biggest single domestic trading unit in Britain. The S.C.W.S. have extensive manufacturing interests in the industry at various Scottish centres.

Charge for Advertising Matter

Under the Control of Paper (No. 48) Order (S.R. & O. 1817 of 1942), the distribution of certain types of advertising matter is prohibited unless a prior charge of not less than 1d. is made. Many firms which were in the habit of distributing *free* advertising matter made wholly or mainly of paper or paper board, *e.g.*, diaries and calendars, falling within the Schedule to the Location of Retail Businesses Order, may now require a licence under that Order before they may *sell* them. In order to save time and paper, a General Licence* has been issued which permits firms to sell such articles at a price not exceeding 1d. without the necessity of applying for an individual licence, provided that they distributed them free during the period September 1, 1939, to August 31, 1940.

The restriction of the price at which such articles may be sold without applying for a licence to one penny is intended to ensure that they are being supplied for advertising purposes and not with the intention of carrying on a retail business in books or stationery.

* Copies of the General Licence (S.R. & O. 1943, No. 424), issued under the Location of Retail Businesses Order, are available, price 1d., through any bookseller or newsagent or direct from H.M. Stationery Office, Kingsway, London, W.C. 2.

* * *

Dr. Fraser Darling

The appointment of Dr. Fraser Darling as a part-time instructor, under the direction of the North of Scotland College of Agriculture, foreshadows an interesting development in the advisory services for crofters in the Western Highlands.

Dr. Fraser Darling is a well-known scientist and writer on food cultivation subjects. In recent years he has, with the assistance of his wife, worked his own croft on the island of Tanera, off Achiltibuie, in Western Ross, and has made many experiments in cropping. He has also studied fish and game habits to encourage food production from these sources.

Society of Public Analysts

The Society held its annual general meeting on March 3. The President, Dr. E. B. Hughes, occupied the chair. The Hon. Treasurer reported a very satisfactory financial year. The Council's report for the year, presented by the Hon. Secretary, showed continued growth of membership, which now totals just over 1,000. The activities of the Society and its local sections had been well maintained, and its journal, *The Analyst*, had had a successful year in spite of severe paper restrictions.

The retiring President, Dr. E. B. Hughes, who had occupied the office for three years, was accorded a very warm tribute of thanks for his services throughout those difficult years.

The following were elected Officers and Council for the comyear: *President*, S. Ernest Melling, F.I.C.; *Past-Presidents serving on the Council*, F. W. F. Arnaud, Bernard Dyer, John Evans, Edward Hinks, E. B. Hughes, G. Roche Lynch, W. H. Roberts and G. Rudd Thompson; *Vice-Presidents*, H. E. Cox, G. Hogan, T. Rendle, W. Gordon Carey (Chairman, North of England Section) and A. R. Jamieson (Chairman, Scottish Section); *Hon Treasurer*, George Taylor; *Hon. Secretary*, Lewis Eynon; *Other Members of Council*, J. W. Corran, R. H. Ellis, J. G. A. Griffiths, D. W. Kent-Jones, R. Lessing, H. M. Mason, B. G. McLellan, M. Pearson, W. H. Simmons, R. W. Sutton, E. Voelcker, K. A. Williams, Arnold Lees (Hon. Secretary, North of England Section) and R. S. Watson (Hon. Secretary, Scottish Section).

* * *

National Society of Caterers to Industry

A number of changes have been made in the composition of the Council of the Society.

Mr. Harold Gardner, of John Gardner (London), Ltd., has been elected chairman of the National Society of Caterers to Industry in succession to Mr. H. J. R. Stent, of Barkers (Contractors), Ltd.

Mr. Alan Hall, of K. and A. Hall (Caterers), Ltd., London, and Mr. C. Belfield Smith, of Agars (1936), Ltd., Manchester, have been elected vice-chairmen.

Lady Annaly has joined the Council of the Society. Lady Annaly is a member of the firm of D. Ellis and Co., Ltd., Wembley.

Other members of the Council elected at its Annual General Meeting are: Mr. N. Abrahams, Staff Caterers, Ltd.; Mr. J. E. Bazley, Pattison-Hughes Catering Co., Ltd., Birmingham; Mr. P. Bennett, Bennetts (Southampton), Ltd.; Mr. L. W. C. Brendon-Cook, Carder Canteens, Ltd., Bristol; Mr. J. B. Freebairn, Northern Caterers, Ltd., Huddersfield; Mr. G. A. F. Layton, Factory Canteens, Ltd.; The Hon. J. D. T. Pepys, Barkers (Contractors), Ltd.; Mr. G. W. Vinson, Catering Contractors, Ltd.

Mr. L. W. Slark, of John Gardner (London), Ltd., was re-elected honorary treasurer, and Mr. Arthur Lawson continues as secretary. Messrs Price, Waterhouse and Co. were reappointed auditors.

* * *

Society of Chemical Industry—Food Group

The Committee, exercising the powers vested in it according to the rules, has appointed the following officers for the session 1943-44: Chairman, Dr. H. E. Cox; Vice-Chairman, Dr. E. B. Hughes; Hon. Treasurer, Dr. J. R. Nicholls; Hon. Secretary, Dr. J. H. Bushill.

* * *

Fuel Efficiency Publications

The Ministry of Fuel and Power has recently issued for the Fuel Efficiency Committee the following new bulletins:

Bulletin No. 11: "Thermostatic Control" (F.E.C. 138).

Bulletin No. 13: "Fuel Economy by Saving Electricity" (F.E.C. 122).

Bulletin No. 14: "Operation and Maintenance of Gas Burners" (F.E.C. 139).

Copies of Bulletins Nos. 11 and 13 have been sent to all large industrial fuel consumers throughout the country, while the distribution of Bulletin No. 14 is being undertaken by the Gas Industry through the Industrial Gas Centres.

The first issue of the "Fuel Efficiency News" is announced. This broadsheet, which will be published monthly, has been sent to all firms receiving the Ministry's Bulletins, and it is hoped that it will stimulate the application of the technical information disseminated by the Ministry and encourage firms to co-operate in the economy campaign.

Bulletin No. 12, on "The Thermal Insulation of Buildings," will be ready very shortly.

* * *

Association of British Sheep and Cattle Dip Manufacturers

At an inaugural meeting on March 9, 1943, the Association of British Sheep and Cattle Dip Manufacturers was formally constituted. Its object is to further the welfare of the British sheep and cattle dip industry, and the precise nature of its activities will be determined by that overriding object.

The officers of the Association are: Chairman, Mr. W. E. O. Walker-Leigh (Cooper McDougall and Robertson, Ltd.); Vice-Chairman, Mr. H. A. Smith (Lawes Chemical Co., Ltd.); Treasurer, Mr. V. G. Gibbs (Wm. Pearson, Ltd.); Auditor, Mr. R. J. H. Hope (Standardised Disinfectants Co., Ltd.); Secretary, Mr. W. A. William, B.Sc.

The offices of the Association are at 166, Piccadilly, London, W.1.

* * *

Rationing in Portugal

The Portuguese Minister for Economy announces that rations will shortly be introduced in Portuguese towns Cards will be issued shortly. There has been no rationing so far in Portugal, although a measure of price control has been in force for some considerable time. It is probable that meat, Bacalhau (dried cod), potatoes and olive oil will be affected.—*Reuter.*

* * *

"Wooden" Meat for Holland

Dutch trade papers are now giving instructions for making model wooden hams and sirloins of beef for butchers to place in their windows after they have sold all their real meat early in the morning.

According to legend, the "respectable poor" of The Hague used to place wooden hams on their tables to save appearances. —*Reuter.*

Bread from Seaweed

Bread made from seaweed, which is claimed to be more wholesome than corn bread, has been made by a Swedish baker, according to the German radio.—*Reuter.*

* * *

U.S. Buys Brazilian Coffee

An agreement between the U.S.A. and Brazil for the purchase of all the remaining stocks of Brazil's 1941-42 and 1942-43 coffee crops was announced recently by the Ministry of Finance. Under the agreement, 12,000,000 sacks of coffee will be sent to the U.S.A. The purchase was arranged by the U.S. Commodity Credit Corporation. Some of the coffee is expected to be reserved for lease-lend and some for U.S. troops.—*Reuter.*

* * *

Peru's Coffee Crop

Peruvian coffee production in 1942 is officially estimated at around 70,600 bags of 60 kilogrammes each, which compares with the total of 105,000 bags in 1941. Labour shortage and lack of rainfall in the Chanchamayo Valley, where 40 per cent. of the total crop is produced, were largely responsible for the decline. Since the end of the year warrants have been issued by the Government for the export of 3,833 bags, which have been shipped to the United States—*Reuter.*

* * *

Argentine Meat for United States

Great interest is being shown in Buenos Aires by Argentine stock raisers in the statement of Mr. Emanuel Celler in the U.S. House of Representatives urging the U.S. Government to abolish restrictions on the importation of Argentine meat in order to solve the meat shortage. The Board of the Argentine Rural Confederation has cabled Mr. Celler expressing appreciation of his statement, and declaring that a mutual economic understanding between the two countries would cement the good-neighbour policy which should be the foundation of Pan-American understanding.

OBITER DICTA

- In this era of "savoury dishes" only the so-called cranks ever think of eating raw vegetables!—*"M. D." in "The Leader".*
- The case against untreated milk as a carrier of disease is as strong as the case against the mosquito as the carrier of malaria. — *Professor W. H. Tytler, in "The Lancet".*
- Why cannot pilchards be packed in tins as they used to be? Those packed at Mevagissey were delicious. It seems such waste of valuable shipping space to import fish in tins from America when Cornwall can produce a better brand.—*Dorothy Hern in "Western Morning News".*
- How would you like to eat brussels sprouts twice a day every day of the year—which 40,000,000 Englishmen, Scots and Welshmen are doing today?—*President Roosevelt at a Press Conference.*
- It is increasingly recognised by the Dominions and the United States that the fate of the primary producer cannot be left to an international game of beggar-my-neighbour. — *"The Times."*
- One of the basic economic facts which Professor Allen Fisher recently recalled to our attention is that as a man's real income rises above subsistence level the proportion of it which he spends on bread declines.—*"Manchester Guardian."*
- The evidence of a public analyst alone as to what was demanded by the public when a particular substance was asked for was not sufficient evidence when challenged, and evidence either from the trade or from members of the public should be adduced.—*Mr. Justice Charles, Mr. Justice Stable, and Mr. Justice Hallett.*
- During the period when the Tunisian campaign was being started we lived on our resources, but we are not doing so at present.—*Lord Woolton.*
- Is it not high time that we abandoned the old idea that industry and agriculture are two things entirely apart, and that we treated our agricultural industry as what it is—namely, an industry just as much as the manufacture of wool textiles or engineering products. — *Mr. William Prince-Smith in a letter to the "Yorkshire Post".*

U.S. Food Experts to Study British Methods

Mr. Claude Wickard, United States Secretary for Agriculture, has informed the Senate investigating committee that his department is sending experts to England "to study how they use their food". He said the reason for this step was the fact that the American people were rapidly approaching a level of nutrition which was comparable to the reduced diet of Great Britain and Canada.—*Reuter.*

* * *

Synthetic Fat

German chemists have invented a new fat which can be manufactured synthetically from nitrogen, water and carbon with the aid of a new catalysing agent, says the German radio. It is said that all fats required for German industry will be obtained by the new process as soon as it is in general use.—*Reuter.*

* * *

U.S. Rice for United Nations

Mr. Claude Wickard, Secretary of Agriculture, has announced acceptance by the U.S. of a recommendation that 620,000,000 lbs. of the U.S. supply of rice shall be available for export to the United Kingdom, Canada, the Soviet Union, Cuba and other countries. This leaves 1,113,000,000 lbs. for U.S. civil and military requirements and for its territorial and island possessions.

The effect of the scheme, recommended by the combined Food Board, is that the quantity of rice available for civilian consumption in the U.S. this year is expected to be about 5 lbs. a head compared with nearly 3lbs. for Canada and 2¼ lbs. for the United Kingrom. The Board recommends a thoroughgoing campaign to increase rice production in all producing areas still accessible to the United Nations and the limitation of consumption to essential requirements. Complete control over more than 95 per cent. of all the rice normally entering international trade fell into the hands of the Japanese with the conquest of Burma, Siam and French Indo-China. These three countries formerly exported an average of 13,000,000,000 lbs. of rice a year. —*Reuter.*

Germs, Wet Feet and Bad Temper

The fifty million days' work lost to the nation each year through common colds and influenza represent one thousand bombers, three thousand tanks and a million rifles, according to a "Victory Editorial" received from the Ministry of Health.

The following quiz is recommended to everybody:

1. What caused your last cold?
2. Was it the fellow who coughed and sneezed beside you on the bus?
3. Is it possible that you handed it to yourself?
4. Could it have been avoided?
5. Careless about getting wet feet?
6. A bit stubborn when the family suggested your wearing a heavier overcoat?

Perhaps you had a rise in temper before you had a rise in temperature. Many doctors believe this. A group of eminent physicians said recently, "Behind much disease lie resentment, fear, jealousy and self-indulgence."

Tackle these germs and we will get to the root of a lot of trouble. We may have fewer colds in the next few months. The country will certainly have more bombers, tanks and guns.

* * *

U.S.A. Cuts Down Ice Cream

A 35 per cent. cut in the milk supply to the ice cream industry has been made by the U.S. Food Administrator. The milk saved will be diverted to milk powder, cheese, butter, and other products needed by the United Nations armed forces.

The cut saves enough milk to product 97,500,000 lbs. of butter and 68,000,000 lbs. of dried and skimmed milk in 1943.

* * *

Kenya Planning Big Food Production

Plans for a still bigger home production drive were laid at a recent conference in Kenya, during which the Governor said that a large consignment of the most modern agricultural machinery was on the way and that the question of big storage accommodation was being investigated. —*Reuter.*

OBITUARY

H. Stanley Redgrove

Herbert Stanley Redgrove, B.Sc., F.I.C., died on March 13 at the age of 57. He was educated privately and at the Regent Street Polytechnic, and graduated Hons. Chemistry, London, in 1908, and was a Fellow of the Institute of Chemistry. He started his career by teaching chemistry and mathematics at Regent Street Polytechnic and West Ham Technical Institute. He visited Russia with an official educational delegation in 1926.

Redgrove commenced writing for the chemical, perfumery, and

food trade press in 1928, and was the London correspondent of *The American Perfumer* since 1930.

Of uncommon versatility, he was the author of about twenty books on subjects so far apart as thermo-chemical constants, philosophy, experimental mensuration, cosmetics, alchemy, industrial gases—his last one dealing with the air mails of the British Isles. He was very interested in practical mathematics and lectured on the subject. His textbooks on experimental mensuration and practical commercial mathematics presented their subjects from a novel angle.

Apart from his scientific and literary work he was well known as an authority on cosmetics. For many years he was a constant contributor to FOOD MANUFACTURE and its allied journals. His *Spices and Condiments*, published in 1933, well known to the industry, is a standard work on the subject.

One of Redgrove's hobbies was field botany. He had an almost complete collection of British wild plants, and was of the opinion that the cultivation of medicinal herbs in this country should have more attention. Another of his hobbies was philately, particularly aero-philately.

Redgrove was a man with an imposing personality, an unremitting industry and a strong sense of humour. He will be greatly missed by his many friends, and periodical literature on the subjects he made his own will be the poorer for his passing.

* * *

Ashworth and Parker, Limited

Messrs. Walmsley (Bury), Ltd., paper-makers' engineers, Bury, have taken a controlling interest in the business of Ashworth and Parker, Ltd., as from March 1, 1943.

Messrs. F. O. L. Chorlton and W. S. Parker have retired from the board of directors, and the vacancies thus created have been filled by the appointment of Mr. John Wolstenholme, as chairman, and Mr. R. P. Timpany.

Messrs. E. S. Hardman, chief engineer, and H. Sheldon, commercial manager and secretary, who have been with the company for many years, retain their seats on the board and will be responsible for the management.

The firm will continue as a separate concern and concentrate as heretofore on the manufacture of high-speed steam-engines, Rotoklene strainers and food machinery.

* * *

Bristol Engineering Directory

This very useful booklet has just been issued. It appears to represent the whole of the industrial activities of Bristol; lists of members, classified index of Bristol trades and other useful data in connexion with Bristol's commerce. It concludes with a useful list of engineering tables.

Copies can be obtained at 9d. each from the Bristol Engineering Manufacturers Association, 104, Filton Avenue, Bristol. The hon. general secretary is J. E. Evans.

Australian Dried Fruits for Britain

A large part of the export surplus of Australian dried fruits this season has been sold to the British Government, says the Commonwealth Minister of Economy.—*Reuter.*

* * *

British Restaurants

An estimated capital expenditure of £1,050,000 on British Restaurant schemes was approved during the financial year ended March 31, 1942. Mr. W. Mabane, Parliamentary Secretary to the Ministry of Food, stated in a written Parliamentary reply that £317,895 was reimbursed to local authorities. The supply of equipment worth £330,000 was authorised through the Ministry's pool.

* * *

Marketing of Tomatoes

In view of a statement that has appeared in the Press, in the course of a report of the meeting of a local branch of a growers' organisation, the Ministry of Food wishes to make clear that it has not invited any national organisation to develop growers' co-operative companies to market tomatoes.

In response to a question on the subject in January, the Ministry replied that the question of growers combining to bulk and forward their produce within the framework of the tomato distribution scheme was one to be considered in the light both of the wishes of a local group of growers and of local circumstances. No pledge could be given in advance that any such scheme would be sanctioned or that more than the growers' price could be paid for the produce; but proposals on the subject would be considered by the Ministry from growers provided they represented not the local branch of a particular organisation, but a majority of local growers.

* * *

Frosted Foods Deal

General Food Corporation announces that it has sold control of its British subsidiary, Frosted Foods, to Lever Brothers and Unilever.—*Reuter.*

Fuel Economy in Catering Trade

A meeting was held recently at the Ministry of Fuel and Power in London with representatives of more than twenty catering trade associations, for the purpose of encouraging further economy in the use of fuel in hotels, restaurants, canteens, cafés, British Restaurants, Government establishments and clubs, etc.

Although considerable fuel saving has already been effected by the formation of a Fuel Economy Committee within certain associations, it was agreed that further progress might be made by the formation of a Central Fuel Economy Committee consisting of representatives of each catering trade association, to act as liaison between the Ministry and the individual associations.

This Central Fuel Economy Committee will advise on general fuel economy problems including maintenance of appliances and plant and will arrange for the distribution of information and publications to the catering trade.

Any difficulties arising will be discussed with the Ministry. The committee will also provide the Ministry, periodically, with specific information relating to the progress of the fuel economy campaign.

It is hoped to extend the activities of the committee to include those catering establishments which are outside the trade organisations.

It was requested that Sir Harold Hartley (adviser to the Ministry of Fuel and Power) should act as chairman of the Central Committee.

* * *

Use of Seed Potatoes

The Agricultural Improvement Council for England and Wales and the Agricultural Improvement Council for Scotland have appointed a Joint Committee to enquire into the possibility of making more effective use of advances in scientific knowledge and use of seed potatoes.

The precise terms of reference to the Committee are: "To report upon the measures required to ensure that scientific knowledge in respect of the production and use of seed potatoes is fully applied in practice."

The Committee comprises: Mr. C. Nevile (chairman), Past President National Farmers' Union; Mr. L. L. Perkins, Chairman, Potato Committee, National Farmers' Union; Dr. H. Hunter, Acting Director, National Institute of Agricultural Botany; Mr. G Samuel, Mycologist, Ministry of Agriculture and Fisheries; Mr. J. Rennie, Chairman, Potato Committee, National Farmers' Union and Chamber of Agriculture of Scotland; Dr. T. P. McIntosh, Senior Inspector, Department of Agriculture for Scotland.

The Secretary of the Committee is Mr. J. H. Dutton, Ministry of Agriculture and Fisheries, Lindum Hotel, St. Annes, Lytham St. Annes, Lancashire.

* * *

West Indian Banana Experiments

Experiments in breeding a banana immune to Panama disease —one of the great worries of the industry—are going on, and banana breeding work on an all-West Indian basis is to be started in Jamaica as soon as possible. The British Government has also provided funds for the investigation of leaf-spot disease, and good work has been done in the last two years.

Improved transport for bananas is another important aspect of the industry, and work on gas storage goes on at the Low Temperature Research Station in Trinidad.

New ground for banana growing is also being developed, and the possibilities of growing the fruit in British Honduras appear better than was considered possible for this colony.

* * *

Food for North Africa

A striking show card has been designed by the Ministry of Production for display in French and native shops in French North Africa selling goods supplied by Britain and the United States under the direction of the Combined Boards.

In a brightly coloured border the card shows the flags of France, Britain and the United States, and the inscription announcing the sale of goods is in French, classical and Moghrabi Arabic. Already 34,000 tons of foodstuffs and 200,000 yards of cloth have been landed in French North Africa from the United Kingdom.

United Canners Limited

The Eleventh Ordinary General Meeting of United Canners Limited was held on Thursday, March 25.

Mr. Joseph B. Dring, chairman and managing director, who presided, said that the profit for the year was £37,978 5s. 3d., but after making provision for income-tax and Excess Profits Tax the net profit was £5,828 5s. 3d., which, with the amount brought forward, gave a disposable balance of £12,615 10s. 2d. It was proposed to pay a dividend of 7½ per cent., less income-tax, carrying forward £7,365 10s. 2d. Taxation on profits was more than 84 per cent., leaving no opportunity for making an allocation to reserve. It would be necessary to rely upon the promised refund of 20 per cent. of the Excess Profits Tax paid at the full rate; it was estimated that this would amount, to date, to a sum of £18,000, subject to income-tax.

After thanking his co-directors for their valuable assistance and the staff for their efficient work and loyal co-operation, the chairman went on to make some comments on the prospect for the current year. He pointed out that since there would be no canned fresh peas for civilian requirements, and for many other reasons, it was very necessary that there should be a pack of processed peas.

There was an attempt to substitute dried peas for processed peas, which was a mistaken policy in the present situation. War workers literally had no time to prepare dried peas, and to cook them in the home used 60 times as much fuel as in the cannery. It was also overlooked that there was so much uncertainty in planning meals that it was not practicable to steep dried peas overnight. Many people disliked them and refused to recognise them as a food.

On the other hand, processed peas were so superior in flavour as to be frequently considered equal to canned fresh peas. Containing as they did 6·75 per cent. of protein, they effectively supplemented the meat ration by supplying vegetable protein in a form which could be readily assimilated. A can of processed peas was a godsend to the housewife when she discovered, as frequently happened, that the meat ration had dwindled more than she had expected.

In connexion with the canning of fresh peas and other vegetables for civilian requirements, it was also necessary to bear in mind that although this had been a mild winter, there might be severe frost next winter, with destruction of fresh vegetables, and in that event it would be disastrous if there were no fresh vegetables canned this summer and in store against such an emergency.

Comparatively little steel would be required to provide supplies of ready-to-serve foods for women war workers, who, in cheerfully accepting their new and more strenuous life, had a right to ask that their health and welfare should receive consideration.

This was a beleaguered island which might at any time be subject to gas attacks. In restricting and even prohibiting the production of canned foods for the workers of Great Britain, he was of the opinion that the Government had adopted a mistaken policy which might have grave consequences in the future.

The report and accounts were unanimously adopted.

* * *

British Pepper and Spice

At the Tenth Ordinary General Meeting of the British Pepper and Spice Company, Limited, held in London recently, the chairman, Mr. Ernest Figgis, J.P., said: We are glad to be able to report that the output from our mills last year created a new record, and we have again to reserve a large amount for E.P.T.

But during the past few months the demand for spices has been considerably reduced, which is hardly surprising when we consider the very unusual quantities that had been previously bought. Owing to the present difficulties of shipping we expect there will be only very small arrivals of spices for many months, but, as will be seen, we are holding exceptionally large stocks. As regards pepper, we have had fair allocations but not enough to satisfy the demand.

Last year I referred to the benefit of a surplus of £2,000 from income-tax reserved but no longer required, so it is gratifying that our net profit this year not only equals but exceeds that of last year, the amount being £12,068, compared with £11,043. We carried forward £3,685, so we have an available total of £15,753 which the directors recommend should be dealt with as follows: That a dividend of 10 per cent. and a special bonus of 2 per cent., both less tax, be paid, which will absorb £9,600; that the reserve account be increased by £2,500 to £30,000, and that the balance, £3,653, be carried forward. We have invested during "Wings for Victory" week a further £5,000 in National War Bonds.

* * *

Express Dairy

Express Dairy Company's final dividend for 1942 on Ordinary and "A" Ordinary is held at 5 per cent. net, again making 8 per cent., tax free. Issued capital is £1,039,894, including £400,000 Ordinary.

* * *

Peek Frean and Co.

Record profits in relation to recent years have been made by Peek Frean and Co., which is controlled by Associated Biscuit Manufacturers. After a provision for contingencies, profit for 1942 was £295,183—an increase of £78,723.

* * *

Prospects for New Foods

That manufacturers of the ever-increasing variety of Army food products, revolutionary as they are, will find a ready post-war domestic and export market is the opinion of Colonel R. A. Isker, chief of the subsistence research laboratory, Chicago Quartermaster Depot.

Among those which should have quick acceptance are: boneless frozen meat; canned ham and eggs; dehydrated, compressed cheese that only wants the addition of hot water and a little mixing for use; stabilised cream with 20 to 30 per cent. butterfat; dehydrated jams and preserves; baked beans and soups.

A product "steeped in possibilities" is a breakfast cereal with sugar and milk solids.

Information and Advice

Fat Extender

8,615. *Required, a suitable formula for a fat extender for use in the bakery trade.* (London.)

As a rule manufacturers have their own formula, which is generally based on an emulsifying agent.

Some of the best formulæ are based on cocoa-butter. A good one would consist of about 30 per cent. cocoa-butter and 70 per cent. dextrinised starch.

You might try a mixture of 30 per cent. cocoa-butter and 70 per cent. potato flour.

Pectin in Fruit Pulp

8,653. *Required, a method for preserving pectin properties in fruit while pulping—that is to say, boiling and sieving immediately the fruit is soft enough to go through the sieve without a heavy loss in weight. Now that the fruit standard in jam is only 20 per cent. instead of 40 per cent., manufacturers are obliged to watch the pectin content of their fruit pulps very closely.* (London.)

The pectin in fruit is destroyed (*a*) during the ripening process by the enzymes present in the fruit tissues, (*b*) by various fungi and bacteria which infect the fruit either before or after picking, (*c*) by heat, where this forms part of the processing treatment.

In sound fruit the enzymes appear to be separated in some way from the pectin and the rate of destruction of the latter is comparatively slow. If, however, the fruit is broken up or bruised, rate of destruction is accelerated, simply because fruit cells are ruptured and the enzymes and pectic juices brought into contact.

Fungi and bacteria do not normally attack the outer skin of fruit, but only enter the tissue at places where this skin is bruised and broken.

By heating the fruit up to the temperature of boiling water, the enzymes are inactivated and the fungi and bacteria killed. The fruit is, of course, very much softened and more or less broken up in so doing.

Sulphur dioxide in the cold and at concentrations permitted by the Public Health (Preservatives, etc., in Food) Regulations, has little or no effect on the fruit enzymes. It almost certainly does not kill all the fungi and bacteria, but it does repress organisms not in an active state of growth. It must be emphasised that once active fermentation has commenced in fruit or fruit pulp, mere addition of sulphur dioxide in the cold will not stop it or even retard it to any appreciable extent.

With the above facts in mind we can postulate certain requirements for retention of maximum pectin content in fruit preserved by means of sulphur dioxide.

(1) Fruit should be picked just under-ripe when the potential pectin content is at its maximum and used without delay.

(2) If the cold process is used the fruit must be whole, in good condition and as free as possible from bruises, etc.

(3) Minced fruit or prepared citrus fruits containing minced centres, and shredded peel, should never be preserved by the cold process.

(4) Where it is required to prepare stone fruit or apples ready for use—*i.e.*, with stone, pips, carpels, etc., removed—the first part of the process will consist of bringing the fruit up to a vigorous boil in a suitable vessel (preferably of wood) by injecting live steam. This will have the threefold effect of inactivating enzymes, killing fungi and bacteria, and softening the fruit tissues. The heated fruit will be passed through a pulping machine to remove stones, etc., and while still hot (180 °F., not less) the requisite amount of sulphur dioxide solution will be thoroughly mixed in, and the smoothed pulp barrelled in freshly steamed-out barrels. Excessive heating must be avoided as this destroys pectin.

Reference to the Jams and Marmalade (Maximum Prices) Order, 1942, shows that of the fruit restricted to a 20 per cent. basis, strawberries, raspberries, and loganberries contain little or no pectin, red and black currants contain useful quantities, but these fruits are likely to be in short supply again this year; gooseberries contain important amounts of pectin. The really pectin-rich fruits—*i.e.*, apples, plums, damsons, greengages, etc.—are still allowed on a 40 per cent. basis.

Information Supplied

8,545. *Information on prevention of mould growth in 20 per cent. solutions of citric acid containing lemon oil.* (Northumberland.)

8,547. *Chemicals employed in manufacture of "butter flavour".* (London.)

8,548. *Details of Statutory Rules and Orders relating to manufacture of synthetic cream.* (Lancs.)

8,549. *Suppliers of banana flour.* (Cornwall.)

8,553. *Information concerning offences under Ministry of Food Regulations.* (Middlesex.)

8,566. *Data on plant needed and method used in manufacture of bone meal.* (Eire.)

8,571. *Manufacturers of perforating machines.* (Eire.)

8,585. *Information on the manufacture of potato crisps.* (Wales.)

8,596. *Suppliers of empty sweet bottles.* (Lancs.)

8,602. *Suppliers of a prune stoning machine.* (London.)

8,603. *Suppliers of machine for mincing mint for mint sauce.* (London.)

8,604. *Suppliers of equipment for automatically handling potatoes on a large scale.* (Middlesex.)

8,608. *Information concerning use of vegetable marrow for sauces and pickles.* (Scotland.)

8,612. *Firms handling marzipan.* (London.)

8,613. *Firm making continuous autoclaves.* (Glos.)

8,625. *Suppliers of machinery for manufacture of potato crisps.* (London.)

Information Required

8,637. *Suppliers of wheat gluten suitable for edible purposes.* (Lancs.)

8,665. *Name and address of manufacturers of Brown control tubes used on sterilisers, etc.* (Glos.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Improvements in or Relating to Solidified Edible Fats and to the Methods of Manufacture thereof

This invention is for improvements in or relating to solidified edible fats such as margarine, compound lard, baker's shortening, and to the methods of manufacture thereof.

There is provided a malted solidified fat when prepared by emulsifying malt or malt extract with a liquefied fat out of contact with the air, subsequently cooling the emulsion either out of contact with the air or with a very short period of exposure to the air not exceeding a few minutes, to the solidified state and then kneading the resultant solidified fat under a relatively high vacuum and extruding it into blocks or strips, whereby malt or malt extract is dispersed homogeneously throughout the fat under conditions which inhibit fermentation. Conveniently the malt or malt extract is first mixed with an emulsifying agent before it is incorporated in the fat.

In some cases the malt or malt extract may be added to the fat in the dry state and is dispersed throughout the fat in such state.

By the invention it is possible to produce solidified baking fat in which malt or malt extract is so incorporated that it is dispersed throughout the fat so that equal volumes or weights of fat each contain substantially the same proportion of malt or malt extract. Generally it is preferred to employ malt extract, and this is compounded with an emulsifying agent which will assist in the dispersion of the malt extract throughout the fat.

For certain fats it may be desirable to use dry powdered malt, and to disperse this malt thoroughly in the fat before the addition of any water or milk, so that the dry powder is completely encased in a protective coating which cannot be broken down by the subsequently added moisture.

The proportion of malt employed will generally be between the limits of 0·1 per cent. and 10 per cent., although for particular purposes a greater proportion of malt may be used.

When the malt is incorporated and dispersed in a solid fat, one of the main advantages from a baking point of view is that the solid fat can be weighed with considerable precision, and, since the malt proportion is accurately defined in relation to the total quantity of fat, it is easy for the average baker to control precisely the amount of malt included in a batch of baking.

Suitable emulsifying agents are the products sold under the trade names "Homoden" or "Paf", but any other emulsifying agents normally used in the margarine industry may be employed.

534,223. Leo Gurwitsch.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

549,143. CORN PRODUCTS REFINING Co.: Conversion of dextrose to levulose.

549,144. CORN PRODUCTS REFINING Co.: Production of levulose.

549,188. BAMBER, W.: Cardboard boxes.

549,190. KLEEN, N. E. AF.: Absorption refrigerating apparatus.

549,199. INTERNATIONAL COMBUSTION, LTD., and HARLOW, W. F.: Apparatus for grading powdered material.

549,247. BROOKES, A. E.: Potato-planting machine.

549,299. BRITISH THOMSON-HOUSTON CO., LTD. (GENERAL ELECTRIC CO.): Cabinets, particularly for refrigerators.

549,248. SUTCLIFFE, LTD., R., and SHEPPARD, J.: Endless-belt conveyors.

549,250. BAYON, H. P.: Revolving mixing apparatus and processes carried out therewith.

549,289. AKTIEBOLAGET ELEKTROLUX: Oil burners for absorption refrigerating apparatus.

549,306. ROCHE PRODUCTS, LTD., and BERGEL, F.: Manufacture of keto-alcohol acetates.

549,309. KENT, H. C.: Seed sowers or seed injectors. (Cognate application, 9373/41.)

549,320. HADDAN, R. (MOFFATS, LTD.): Electric heating apparatus for liquids or foods containing liquids.

549,322. AKTIEBOLAGET G. AREHNS MEKANISKA VERKSTAD: Bags of paper or similar sheet material.

549,357. DAY, F. C. R.: Collapsible boxes and cases.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

DARRAX.—620,166. All goods included in Class 30. **Westlake, Wilkinson and Company, Limited,** 50, Pall Mall, London, S.W. 1; Manufacturers and Merchants. (By consent.)

HURRICANE.—620,248. Cereals prepared for food for human consumption, and flour. **Joseph Rank, Limited,** 107, Leadenhall Street, London, E.C. 3; Millers.

SPITFIRE.—620,249. Cereals prepared for food for human consumption, and flour. **Joseph Rank, Limited,** 107, Leadenhall Street, London, E.C. 3; Millers.

NEW MULSENE.—620,331. Fat economising substances, composed principally of vegetable matter, for use by bakers and confectioners. **A. Goldrei and Co., Limited,** Tabard House, 116, Southwark Street, London, S.E. 1; Merchants.

COOLTEX.—620,633. Cream ices, ice cream and confectionery (not medicated). **John Spouge,** 47, London Road, Grantham, Lincolnshire; Confectioner.

New Companies

T. P. Stewart, Limited. (377521.) 1, Westbourne Terrace, Shiney Row, Co. Durham. To take over the bus. of grocers, bakers, provn. mchts. and genl. dlrs., carried on as "T. P. Stewart" at Shiney Row and elsewhere in Co. Durham. Nom. cap.: £5,000 in £1 shares. Dirs.: R. H. Stewart, Margaret F. Stewart and Aurora Stewart, all of 1, Westbourne Terrace, Shiney Row, Co. Durham.

J. Hart and Co., Limited. (377581.) 13, Verulam Road, St. Albans. To carry on bus. as caterers, bakers, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: J. Hart, Ethel M. Hart and Clarence M. Hart, all of 13, Orchard Close, St. Albans.

Frank Marshall, Limited. (377605.) To take over the bus. carried on as the "Worcester Park Dairy" at 17, Coombe Road, New Malden, and at Motspur Park and Kingston Vale. Nom. cap.: £7,000 in £1 shares. Dirs.: Mrs. J. Marshall, 3, Linkfield Lane, Redhill, Surrey; R. E. Butt, 4, Wimbledon Close, The Downs, Wimbledon, Surrey.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.